Gas Journal

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Editorial Notes

The North British Meeting

THE Annual General Meeting of the North British Association was held on Thursday of last week at Kirkintilloch under the Presidency of Mr. James Dickson, when members and their friends enjoyed the hospitality of the Provost, Magistrates, and Town Council of the Burgh. The meeting, a report of the proceedings at which will be found on later pages of our issue to-day, was voted a great success, as also was the excursion to Inveraray on the day following, arrangements for which had been so admirably organized by Mr. Archibald Kellock.

The Presidential Address of Mr. Dickson and the two Papers presented at the meeting—one by Mr. M'Isaac, of Glasgow, the other by Mr. Barker, of Nairn—provided a variety of interest. Mr. Dickson's Address is a story of steady progress in gas sales from 58 million cu.ft. in 1907 to 186 millions at the present time. This progress is traceable to increasing efficiency of manufacture, the steps taken to ensure adequate pressure at all points of the area of supply, and insistence on good service. Mr. Dickson possesses a flexible plant, horizontals and carburetted water gas, with provision for naphthalene extraction and benzole recovery and gas drying, and he enjoys a very good by-product market; his high-pressure mains render it easy to maintain ample volume and pressure of gas in the various districts; and his sales organization, which includes a " free " maintenance scheme, means satisfied consumers. A block system of charges is in force at Kirkintilloch, the first block commencing at the remarkably low figure of 5·5d. per therm, this rate being gradually reduced to 4d. per therm. It is not surprising that with such good service and with such cheap gas the average annual sale per consumer within the burgh is over 40,000 cu.ft. Nor is it surprising, in view of such figures, that Mr. Dickson points to the fact that a low cost of the therm into holder, and more especially a low selling price, is not necessarily the prerogative of the large undertaking. Kirkintilloch has every right to be optimistic of the future.

The Paper by Mr. M'Isaac indicates the versatility of gas in the sphere of industry and shows how essentially gaseous fuel is fitted to assist in the development of new industrial processes—indeed, the success of these processes is dependent on the use of gas. The Paper also demonstrates that the Glasgow Gas Department is ever on the alert to take advantage of opportunity and to make sure that gas, once installed, is not displaced by competitive fuels. The Author summarizes the new appliances fixed during the past 12 months and they cover a remarkable variety of applications. It may be mentioned that the additional gas consumption brought about by the installation of this new equipment is nearly 69 million cu.ft. Among the processes described in the Paper are, for instance, envelope making, the defreezing and boiling of tripe, and automatic soldering; and the Author mentions that biscuit bakers in Glasgow account for an annual gas consumption of 273 million cu.ft., and bread bakers for another 145 millions a year. The figures relating to the amount of gas used in particular processes will prove of value to those in any area of supply.

Copper Pipe

MR. BARKER'S contribution, which deals with the use of copper pipe for services and carcassing, is of very great interest. Since 1928 the Nairn Gas Light Company has used only copper for gas services, and the account given in the Paper should remove doubts as to the wisdom of employing this metal. At Nairn the copper services are run direct from the main to the meter, and from the meter to the appliances, without any solder joint, metal-to-metal joints being employed; and when fitting high-grade appliances chromium-plated pipes and connections are used in keeping with the quality and appearance of the apparatus. In regard to costs, Mr. Barker sets out a comparison between wrought iron, lead, and copper, and on his figures there is practically no difference between iron and copper, taking into account the costs of labour in laying. The Author points to the strength of copper pipe and puts forward the advantages attaching to its use. These advantages include freedom from stoppages caused by internal corrosion, in certain circumstances longer life, smaller loss of pressure due to frictional resistance to gas flow, the fact that copper can be bent, maintaining a smooth flow through the pipe, and the fact that copper is always saleable. There seems no reason to doubt that copper is destined to play an increasingly important part in gas distribution work; and

Mr. Barker has performed a useful service in giving the Gas Industry the benefit of his experience.

At the same time, we cannot regard as other than unfortunate that he should have decided to employ a special type of meter for use with copper pipe. His Paper includes photographs of meters having special inlets and outlets, one with bottom inlet and top outlet, another with bottom inlet and outlet, and a third with inlet and outlet at the top. On several occasions we have urged the desirability of standardization of meter design. Nearly a year ago the Meters Committee of The Institution of Gas Engineers issued their specification for the " I.G.E. Gas Meter," with the aim of reducing the number of classes and sizes of meter. The position had become most complicated by undertakings insisting on individual specifications, and it was mentioned at the Research Meeting last November, when the Specification was introduced, that according to one meter maker actually twenty-one stocks had to be carried—and naturally this has a bearing on costs. At the present time a British Standard Specification for meter union sizes is being prepared at the request of and in collaboration with the Meters Committee of the Institution. Any tendency to depart from agreed standard practice is to be deprecated.

The South Metropolitan Tariff

If we look back at the history of the Gas Industry, it is surprising to find in how many cases developments which have become a fundamental part of the Industry's working have been pioneered by the South Metropolitan Gas Company. Moreover, it has never been a habit with the Company to introduce its reforms in an embryo state, and the mere fact that they are introduced can be taken as a sure indication that they are the outcome of a vast amount of thought and investigation; that they have, in fact, survived a very acid test of fitness to serve the co-partnership of consumer, shareholder, and employee at whose benefit this great Company always aims.

These thoughts occur to us in connection with the introduction last Friday of a new tariff whereby, as from the next monthly meter reading, the century old flat-rate method of charging for gas will be abolished, and the domestic consumers of the South Metropolitan Company, numbering well over 400,000, will pay according to a uniform, and scientifically worked, step rate system. Full particulars are given in other pages of this issue, and they will undoubtedly be studied and discussed with the greatest assiduity throughout the Industry. There is no need for us to comment on them in detail; the meaning of service, demand, and commodity charges is well enough understood by readers of the " JOURNAL," and their incidence in the three steps of the tariff is clear enough. The most striking feature, and the one in which it differs from nearly every other, is that it is not optional, but will apply to all except those whose supplies are the subject of special contract. Anybody of the slightest intelligence to whom are explained the principles involved cannot well dispute the unfairness both to the gas undertaking and to the remunerative consumer of the flat rate system of charge. The South Metropolitan Company has accordingly had the courage of its convictions, and has gone forward with confidence that its great body of consumers will see the equity of the step it has taken in introducing a system by which a certain number of gas bills must inevitably, in the transition stage towards higher individual consumptions, show increases without increased gas service.

A Bold Policy

We have spoken in general of the exacting investigation which precedes the introduction by this Company of its reforms. In particular we know that in this case every conceivable system of charging, each with its almost endless permutations and combinations of prices, was passed in review and rejected by Dr. Carpenter and his colleagues before they adopted the new tariff. In other words, their conviction of the need for a new system to meet the altered social conditions and habits of the people was no sudden idea equally suddenly implimented. On the other hand, having once satisfied himself that a tariff has been found which, as regards system and rates, satisfies his standard not only of what is equitable to consumer, employee, and shareholder, but is at the same time definitely promotional, Dr. Carpenter has not hesitated to go the whole way with it, and, in abolishing altogether the flat rate, he has shown courage which will be the envy of many a gas manager with far less at stake.

Of one thing we can be quite certain. Whatever agitation there may be in the newspapers and elsewhere—largely inspired no doubt by competing interests—on behalf of the " little " man and his increased gas bill, the Company will not go forth with its tariff in any apologetic mood. For the explanation of the new system it has issued extremely well devised literature to all its consumers, and it is mobilizing the whole army of its employees to become personal representatives of the Company in this matter until it is fully understood throughout the area. It is essential that consumers shall be made to grasp the essential fairness of the scheme, and to think of the gas bill not by itself, but in relation to their total requirements of lighting, heating, and cooking. As the Company explains, it is acting in conformity with what is now recognized as the best modern practice—a practice which our chief competitor, the electricity industry, has had impressed upon it by various Government Committees, and which it has very widely adopted without any outcry on behalf of the public. It is a practice which is accepted in connection with that great public service, the telephone, and which, in fact, the great body of telephone subscribers would yield with the greatest reluctance. It is true that innovations in such matters are accepted with less surprise from the newer industry of electricity supply, and that the small consumer of gas has, as a general rule, not learned the lesson as a regular user of the telephone, so that the Company can hardly expect an entire absence of opposition. At the same time, with both right and determination on its side, it is hardly in question that it will achieve success—success which will be a wonderful tonic to many who continue to waver.

Lighting and Safety

The vast improvements which have been made during recent years in street lighting equipment, and the developments in street lighting technique, were well demonstrated at the Conference of the Association of Public Lighting Engineers which was held at Cheltenham last week. The Conference, let it be said at once, was a great success and in the number of those attending constituted a record. In respect of both delegates and Papers the Gas Industry was well to the fore. Sir Charles Bressey, C.B., of the Highway Development Survey of the Ministry of Transport, opened the proceedings, and a message was received from the Minister of Transport congratulating the Association on its good work in helping to make

our highways safer for all classes of user. Safety and adequate lighting are, of course, interwoven, and it was only natural that the influence of good lighting on safety should have been the main theme at the Conference.

In his Presidential Address to the Association, Mr. E. C. Lennox points out that the greatest number of accidents on the roads occur in the winter months during the hours of 5 p.m. to 8 p.m., and in the summer months during the hours of 10 p.m. to 11 p.m.—that is, during the hours where artificial lighting in the streets is essential. And no one will question the statement that during these hours the volume of traffic is considerably less than during hours of daylight. From the details of the traffic census Mr. Lennox arrives at the conclusion that the proportion of night to day traffic throughout the year does not exceed 33%; and the statistics which he sets out show the large increase in night traffic during the past seven years. As indicative of how good lighting can reduce accident risk, data are given for a full year on a stretch of roadway before and after improved lighting had been installed. Despite an increase in traffic of over 80%, the improved lighting resulted in a very great reduction in the number and severity of accidents at night. Mr. Lennox mentions that at Detroit it was found that the ratio of night to day accidents was doubled when lighting was curtailed by 35%. If better visibility were provided during dark hours on heavy traffic routes and in built-up areas, the accident rate would decrease materially; and there is good reason to believe that the economic gain due to decrease in accidents would more than meet the extra expenditure necessary to provide adequate public lighting.

The Time Factor

The increase in speed of motor vehicles renders a higher standard of illumination all the more necessary. Mr. W. J. Jones, Manager of the E.L.M.A. Lighting Service Bureau—and incidentally in his Paper on electric street lighting progress he mentions that members of the E.L.M.A. expend between them no less than £200,000 per annum on research, the bulk of which relates to the improvement of electric lamps—deals with the time factor in seeing. This factor is most important. Street lighting which was good enough for slow moving vehicles is hopelessly inadequate for rapidly moving traffic. As an example, a pedestrian walking at three miles an hour has 23 seconds to discern a stationary object 100 ft. ahead before coming up to it. On the other hand, a motorist travelling at 45 miles an hour has only 1½ seconds to discern a similar object and take action to avoid it. Another factor which makes for safer driving at night is kerbline visibility, and this is the subject of a Paper at the Conference by Messrs. F. C. Smith, K. F. Sawyer, and D. G. Winslow. They suggest that it may be possible to incorporate in a street lighting specification some requirement as to kerbline visibility; and that in the meantime it would be well, in view of the high contrast values experience has shown to be necessary to reveal the kerbline in the last three classes of the British Standard Specification, if in these classes the maximum kerbline visibility could be promoted by restricting the lamp positions to kerb mounting as far as possible. In any case, "good kerbline visibility may be obtained by relatively simple means which are compatible with the requirements of both driver and pedestrian."

That gas can well fulfil modern requirements in the street lighting field is shown by Mr. W. J. G. Davey and Mr. A. R. Gibbon in their description of typical examples of gas street lighting installations—a Paper contributed for the Lighting Section of the Society of British Gas Industries. The Authors conclude their Paper by saying that the Gas Industry will continue to advance the cause of safer roads by the installation of efficient and reliable street lighting; and they certainly show how great has been the advance in the efficiency of equipment and the right application of this equipment. Much research has been carried out on gas lighting, but the amount is dwarfed by that undertaken by the electricians and mentioned in the foregoing. And in this connection it is essential that the Gas Industry should realize that retention of the public lighting load is one of the strongest bulwarks against competition. The Central Electricity Board is concentrating on the lighting load. It is their most remunerative load; and the greater the amount of plant put down to meet the lighting demand, the more can the electricity industry offer cut rates at off-peak hours, with the aim of cutting into the day load of the Gas Industry and levelling the output curve. As we have said previously, any loss of gas lighting goes much deeper than the mere loss of revenue entailed; it paves the way to the most intense form of electrical competition in other fields.

Dirty Water

We cannot understand why, in his Presidential Address to the Engineering Section at the meeting of the British Association for the Advancement of Science, Professor William Cramp should have chosen to pillory the Gas Industry, though we are not surprised that his shafts of ridicule were seized upon by the national Press. "Gas authorities," he is reported to have said, "were at present actively pushing the use of the gas cooker on which the engineer had provided an outlet for a flue connection, but it was rare to find this outlet connected with a chimney or flue, with the result that the air of a small kitchen became foul, and acid-laden moisture ran down the walls. The engineer was not allowed to control what was obviously an engineering matter." This, of course, is nonsense. General experience indicates that about 60% of the heat of a gas cooker is used on the boiling burners, 20% on the griller, and only 20% in the oven. Connecting the outlet of the oven to a flue would, therefore, not satisfy Professor Cramp's demands. Moreover, engineering considerations would render it inadvisable in many instances to ventilate the oven to a chimney. We would remind Professor Cramp that in this country there are about 9,000,000 gas cookers in daily use, very few of which are vented to the outside air; and if there was anything fundamentally wrong with the prevailing conditions of use the British public would have had something to say about it.

To strengthen his argument that the engineer is not allowed to control what is an engineering matter, Professor Cramp said that coke is often delivered to houses with 20% of water in it. "Dirty water at, say, 30s. a ton is dear. It is said that the water is due to the quenching of the coke as it leaves the retorts, and therefore the engineer is to blame. The engineer would be quite willing to dry the coke, or alternatively to declare the moisture content, so that a proper allowance could be made, but this would not suit the salesman." The learned Professor is behind the times—and surely he does not think that the salesman dictates to the gas engineer,

demanding coke with a high moisture content! The facts are that gas engineers throughout the country are doing all possible, bearing in mind practical economic considerations, to supply smokeless fuel having a low water content, and that the attention which is being so generally paid to the marketing of coke low in ash and moisture, and suitably graded, is reflected in the growing public demand for the Gas Industry's smokeless solid fuel.

Had the newspapers stated the official capacity of Professor Cramp, the position would have been clearer and his observations on the supposed working of the Gas Industry would have been taken with more than the proverbial grain of salt. Actually he is Professor of Electrical Engineering at Birmingham University, and it is of interest to note that, when delivered to the consumer, the coke produced by the Birmingham Gas Department does not exceed 5% moisture content. Professor Cramp, we assume, adds another 15% for luck.

At Last!

TRULY the ramifications of our Industry seem boundless. We have from time to time placed at the disposal of a wondering public various ingenious devices for making their lives easier and pleasanter. We have surprised them by producing gas fires that light themselves, street lamps which operate regularly at sundown as at the touch of an unseen hand, water heaters which pop on suddenly at the turn of a tap, flames that freeze, gas fires which look like log fires, coke fires which feel like . . . well, and much more besides. But we have not been markedly successful in our efforts to produce gas radio.

However, we need no longer be discomfited on this score, for news reaches us from that land of tall storeys beyond the Atlantic that the Industry there has succeeded where others have failed, and, quite inadvertently perhaps, has provided the perfect combination of gas meter-cum-wireless set. According to reports, one, Mr. Munn, of New Jersey State, was disturbed by strange noises in his cellar, and investigation brought to light the fact that they were proceeding from his gas meter, which was seemingly picking up radio broadcasts very effectively.

History does not relate whether Mr. Munn has since removed his gas meter to the lounge and encased it in a walnut cabinet or whether he still has to descend to the cellar to listen in; or whether, if a slot meter, his wireless is cut off when the gas runs out. Does the "twiddling of the knob," we wonder, when one places a coin in the slot, automatically act as a wave-length selector? Should this admirable practice be extended to this side of the ocean, we can almost visualize the tens, hundreds, and thousands of cubic feet figures on the familiar dial being replaced by "London National," "Midland Regional," and "Radio Paris." Then, as each ten units of gas are consumed and the hands revolve, perhaps the "set" will automatically select another station, thus giving infinite variety to the consumer. It might, indeed, provide an excellent method for increasing gas consumption. The fat stock prices from the B.B.C. could quickly be replaced by dance music from Paris by letting the gas water heater in the bathroom run for a few minutes, while those who wished the Chamber Music to continue could, on the other hand, attain this end by turning off the gas light and sitting in the dark. Certainly there are vast possibilities in the scheme.

But why should the humble and—even to the least critical—not exactly æsthetic gas meter be selected for this sudden promotion, wasting, as it were, its new-found merits on the cellar air? Surely it were better for the weather forecast to issue from beneath the canopy of the drawing-room gas fire than to have to crouch with an ear to the boot-cupboard or in such other inconvenient place as the gas meter usually finds habitation. If nothing else, it may, however, lead to a move in the direction of "brighter gas meters." We suggest a model in weathered oak for building into the overmantel would be very popular, while the portable "metergram" should also be a hot favourite with many, as it could be wheeled into the hall by those who do not like the meter reader tramping with muddy boots across the Persian carpet. But doubtless the Institution Sub-Committee on Gas Meters will give their serious attention to a matter which holds such interesting potentialities.

Forthcoming Engagements

Sept.

17.—S.B.G.I.—Council Meeting at 2.30 p.m.

17.—I.G.E.—Refractory Materials Joint Committee at 2.30 p.m.

24.—WALES AND MONMOUTHSHIRE ASSOCIATION.—General Meeting at Porthcawl.

25.—NORTH OF ENGLAND ASSOCIATION.—Autumn Meeting at Middlesbrough.

Oct.

2.—I.G.E.—Liquor Effluents and Ammonia Committee at 11.15 a.m.; Joint Research Committee at 2.30 p.m.

3-6.—B.C.G.A.—Jubilee Conference at Bath.

5.—I.G.E.—Joint Lighting Committee at 2.30 p.m.

6.—I.G.E.—Research Executive Committee at 2.30 p.m.

8.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting and Paper by Mr. H. Hollis.

12.—I.G.E.—Finance Committee at 1.45 p.m.; Membership Committee at 2.15 p.m.; General Purposes Committee at 3 p.m.; Benevolent Fund Committee of Management at 4.30 p.m.

12.—WOMEN'S GAS COUNCIL.—Executive Committee at 11.30 a.m. Branch Secretaries meeting at 2.30 p.m.

13.—I.G.E.—Council Meeting at 10 a.m.

14.—I.G.E.—Board of Examiners at 2.30 p.m.

15.—EASTERN COUNTIES ASSOCIATION.—Autumn Meeting at Chesterfield.

16.—B.C.G.A.—Scottish Conference at Aberdeen.

20.—I.G.E.—Gas Education Executive Committee at 11 a.m.; Gas Education Committee at 2.30 p.m.

22.—COKE OVEN MANAGERS' ASSOCIATION.—Annual Dinner at the Hotel Victoria, Northumberland Avenue, W.C. 2.

Nov.

2.—BRITISH GAS FEDERATION.—Second Annual General Meeting at Grosvenor House, Park Lane, W., at 3 p.m.; Third Annual Dinner at Grosvenor House at 7 p.m.

3.—I.G.E.—Council Meetings, 9.30 a.m. and 4.30 p.m., at the Institution of Mechanical Engineers.

3 and 4.—I.G.E.—Autumn Research Meeting.

17.—I.G.E.—Gas Education Executive Committee at 2.30 p.m.

26.—I.G.E.—Advisory Committee on Research at 2.30 p.m.

27.—I.G.E.—Liquor Effluents and Ammonia Committee at 11.15 a.m.; Joint Research Committee at 2.30 p.m.

Personal

At a meeting of Newmilns Gas Committee last week Mr. WILLIAM PHAIRN, M.Inst.Gas E., tendered his resignation as Engineer, Manager, and Secretary of the Corporation Gas Department. He is leaving to take up a similar appointment at Caernarvon, and his resignation will take effect from Oct. 3.

Mr. Phairn was trained as an engineer and later entered the service of the Glasgow Corporation Gas Department, where he served two years. In 1925 he was appointed to the Troon Corporation Gas Department, where he remained for 21 months, and in 1927 he accepted a post as Deputy Engineer with the Newton-on-Ayr Gas Company, and during the past eight years has been at Newmilns. Mr. Phairn received his early training at the Royal Technical College, Glasgow.

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Councillors G. E. SLACK and T. O'CONNOR, Members of the Accrington Town Council, have been appointed to vacancies on the Accrington District Gas Board.

* * *

The Pitlochry Gas Light Company have appointed Mr. JAMES YOUNG, of Dingwall, as Manager of the Gas-Works in succession to Mr. A. M'ALPINE, whose resignation after 21 years' service was announced in last week's issue of the "JOURNAL." Mr. Young is a native of Newmilns, Ayrshire, and it is interesting to note that seven of his family and relatives hold appointments as gas managers in various parts of the British Isles.

Obituary

The death is announced of Mr. JOHN OXLEY, who passed away peacefully after a stroke on Friday, Sept. 11, at St. Albans.

Mr. Oxley had retired recently after over forty years' service with Messrs. George Waller & Son, Ltd., whom he represented for thirty years in England and Ireland. His genial and unassuming manner and readiness to give advice on all technical matters with which he was acquainted ensured for him a wide circle of friends.

Recent Gas Lighting Contracts

Many Long-Term Contracts

Under a new public lighting contract the streets of Fairford will be lighted by gas for a period of five years. Previous agreements have been for one year only.

About 288 gas lamps are involved in a new contract affecting the lighting of Braintree and Bocking.

Following on a five-year contract a ten-year agreement for gas lighting has been entered into by the Stamford Corporation. Over 300 lamps are involved. The contract embodies a clause providing for a sliding scale of prices should the price of gas fluctuate.

Other recent agreements for gas lighting have been arranged in Dungannon, Long Melford (Suffolk), High Bentham (Lancs.), Totnes (Devon), Knottingley (Yorks.), Ledbury, and Burgess Hill (Sussex).

North of England Gas Managers' Association

Programme for Autumn Meeting

The Autumn Meeting of the North of England Gas Managers' Association will be held at the Grand Hotel, Middlesbrough, on Friday, Sept. 25, at 11.15 a.m. The chair will be taken by the President, Mr. J. Corrigan, of Brighouse, who will deliver his Address.

Luncheon will be provided at 12.45 p.m. at a charge of 2s. 6d. each. In the afternoon on the kind invitation of Messrs. Cochranes Foundry, Ltd., a visit will be paid to the new centrifugal iron pipe plant at their Ormesby Iron Works. Arrangements have been made for the free parking of cars in the station yard opposite the Grand Hotel and also at Messrs. Cochranes' Works. Following their tour of inspection the Members will be the guests of Messrs. Cochranes at tea.

Gas Journal Shewring Fund

Donations are invited to the Fund, full particulars of which were given in the "JOURNAL" for July 22. The Management of the Fund is in the hands of Messrs. F. G. Shaw (Buxton), W. W. Townsend (Colchester), and J. Bridge (Elland). All expenses having been guaranteed, the whole of the sums received will be applied, without any deduction whatsoever, to the benefit of the widow and children of Harold Shewring, by whose tragic death earlier this year they were left in distressed circumstances.

Cheques should be made payable to the "GAS JOURNAL," and crossed "Shewring Fund Account." All donations will be gratefully acknowledged by the Editor, who is Treasurer to the Fund.

We are pleased to state that the total of the Fund now exceeds £470, which includes an amount of £68 1s. 6d. subscribed by the "Rochdale Gas Committee, Gas Engineer, Staff, and Workmen; the Mayor, Aldermen, Councillors, and Chief Officials of the Rochdale Corporation, and other friends at Rochdale." It is with great gratitude that we acknowledge this tribute to his memory from the Undertaking of which Harold Shewring was Engineer and Manager before going to Cambridge, and we publish below a letter on the subject addressed to Mr. Shaw by the present Engineer and Manager.

From Friends at Rochdale

F. G. SHAW, Esq.,
Gas-Works,
Buxton.

DEAR MR. SHAW,

I wish to inform you that I have to-day forwarded a cheque for £68 1s. 6d. to the "GAS JOURNAL" as a donation to the Shewring Fund, on behalf of the following:

"The Rochdale Gas Committee, Gas Engineer, Staff, and Workmen; the Mayor, Aldermen, Councillors and Chief Officials of the Rochdale Corporation, and other friends at Rochdale."

May I say that everyone approached here in this connection has been very sympathetic, and the response as shown by the sum indicated has, in my opinion, been very good.

In this connection I have to thank my Chairman, Councillor A. Ashworth, J.P., for his efforts with the Councillors and many friends of the late Mr. Shewring, with whom I have not yet become personally acquainted.

I am pleased to know that the Fund generally is meeting with a good response, and I trust that our efforts at Rochdale will give a further impulse to others who may not yet have contributed.

Yours faithfully,
(Signed) CECIL H. BAMBER,
Engineer and Manager.

County Borough of Rochdale,
Gas Department,
Dane Street, Rochdale.
Sept. 11, 1936.

Smoke Abatement Exhibition

Oct. 2 to 31, 1936

The National Smoke Abatement Society of Great Britain, with the co-operation of interested Government Departments and industrial associations, has organized a special exhibition which will be opened by the Minister of Health, the Right Hon. Sir Kingsley Wood, M.P., on Oct. 1, and will remain on view at the Science Museum, Kensington, from Oct. 2 to 31. The exhibition is intended to illustrate the nature and effects of the pollution of the atmosphere by coal smoke, and the scientific means now available for measuring the pollution and for reducing it.

In the domestic section, exhibits have been provided by the electrical, gas, coke, and fuel-oil industries as well as by the distributors of natural and artificial smokeless fuels, while a small group of model houses shows how these smokeless heating appliances can be installed in a typical house.

The Annual Conference of the National Smoke Abatement Society will be held at the Museum from Oct. 14 to 17, and will be opened by Captain H. Crookshank, M.P., Secretary for Mines. Particulars may be obtained from the Secretary of the Society, 36, King Street, Manchester, 2.

News in Brief

During " Cooker Fortnight " the Salford Corporation Gas Department is giving away a self-lighting match with every " New World " cooker ordered.

For a Further Five Years the Morpeth Council have accepted the tender of the Morpeth Gas Light Company for the public lighting of the town. The lighting season has been extended.

Sanction Has Been Granted by the Ministry of Health to an expenditure of £5,950 in connection with the new showrooms, offices, and distribution stores for the Borough of Port Talbot Gas Department.

Wanted—Healthy Competition at Dyserth where the Parish Council last week decided that unless the electricity services were improved, steps would be taken without hesitation to secure for the village a supply of gas.

The Gas Companies' Protection Association at a Committee Meeting on Monday, Sept. 7, unanimously elected Mr. F. G. Brewer, of the South Metropolitan Gas Company, Vice-Chairman in succession to Mr. F. J. Bradfield, retired.

An Unfortunate Accident occurred at the works of the Altrincham Gas Company on Sept. 8, when an explosion in the booster house resulted in the death of a woman, Mrs. Murray, who visited the works daily to supply refreshments to the workmen.

Tenders are Invited by the Hunstanton Urban Council for the relaying of the gas main in the Old Hall area at an estimated cost of £544, including some extensions. It was stated at the September meeting that the present mains had been in use for sixty years and were now totally inadequate for the needs of the district.

The Poppy Day Report of Earl Haig's British Legion Appeal Fund for 1935, a copy of which has been forwarded to us by the Organizing Secretary, states that the Remembrance Day Appeal produced a gross total of £527,302, a very great achievement of which the honorary workers of the Fund have every reason to be proud.

At the Shrewsbury Carnival the second prize in the decorated local trade vehicle class was won by the Shrewsbury Gas Light Company with an original refrigeration entry, " Mr. Therm in a New Rôle." First prize in the humorous group on foot was taken by the Company's Sports Club with " Favourites for the Toronto Legacy."

A Declaration of Calorific Value is announced in the current issue of the *London Gazette* by the Oswestry Gas Light and Coke Company who give notice that on and from Sept. 30, 1936, it will supply gas of the calorific value of 460 B.Th.U. per cu.ft. to all consumers within its limits of supply as defined by the Oswestry Gas Order, 1936.

For New Showrooms a three-storey property in the main thoroughfare has been secured by the Morpeth Gas Light Company. The building includes two valuable features—viz., an entrance for vehicles at the back and an assembly room capable of seating 200. The Company are now very busy converting the premises which were formerly an hotel.

An Interesting Export from this country to the United States of America is a consignment of 5,300 diaphragm leathers for an American gas undertaking. These are supplied by Joymanco (Brighton), Ltd., Cambridge Grove, Hove 3, Sussex, who inform us that they have supplied the same undertaking with their " Joymanco " leathers since 1926 and to date have shipped a total of 27,000.

Almost a Column in the issue for Sept. 4 of the *Aldershot News and Farnborough Chronicle* is devoted to a description of the Ash Road Works of the Mid-Southern Utility Company. The writer of the article pays a high tribute to the men who play such an important part in maintaining an unfailing supply of gas, which " calls for incessant work, care, and attention." The valuable services of Mr. Therm are also eulogized in no uncertain manner.

A Complete " Black-Out " occurred on Sept. 10 when Kirkcaldy's electricity supply failed. The failure, which occurred at 10 p.m., affected the whole town, and for 15 minutes the Burgh was in darkness except for those houses and streets lit by gas. After 15 minutes the supply in the lower part of the town was restored but the upper part remained without power for an additional hour and a quarter. The trouble was caused by a mouse " shorting " a high tension circuit.

The Blast Furnace Capacity of the Stanton Ironworks Company, Ltd., is now being increased. The Company are making it possible to blow an additional furnace at both their Stanton and Holwell Works. When these additions are completed they will be able to work at the same time five furnaces at Stanton and four at Holwell. These are in addition, of course, to the two recently erected furnaces at Wellingborough.

An Order has been received by the Woodall-Duckham Vertical Retort and Oven Construction Company from the Cargo Fleet Iron Company, Ltd., Middlesbrough, for a W-D Continuous CS_2 Removal Plant (Barbet System) to deal with 4,800 gallons per day of 80% at 120° C. washable crude benzole. The plant will be installed at the central benzole refining plant of the Cargo Fleet Iron Company and will treat benzole from the coking plants of the Cargo Fleet Iron Company and the South Durham Steel and Iron Company.

An Exhibition and Cookery Demonstrations will be held by the Welshpool Lighting and Power Company from Oct. 5 to 9, inclusive, in conjunction with General Gas Appliances, Ltd., and Messrs. W. H. Dean & Sons. Cookery and washing demonstrations will be given twice daily at 3.15 p.m. and 7.30 p.m. Normally the hall is lighted by electricity but gas will be used during the period of the exhibition. An exhibition held earlier this year attracted a great deal of attention and sales of cookers and water heaters were highly gratifying.

A Change of Ownership has taken place at Wigtown where the Council have leased their Gas-Works to Mr. William Downie, of Cumnock, who made an offer to them some weeks ago. An agreement has been drawn up whereby Mr. Downie will pay the Council an annual rent of £50 for the Works. He also binds himself to provide the town with a supply of gas and to maintain the Works in a satisfactory state of repair. According to the latest returns Wigtown has a total make of 2·5 million cu.ft. per annum manufactured in Tully plant.

Cinematograph Films showing the construction of the all-welded gasholder at Newhaven and the all-welded purifier installation at Stretford will be a feature of a lecture to be given by Mr. H. Hollis at a Meeting of the Eastern District of the Southern Association of Gas Engineers and Managers on " Electric Welding in the Gas Industry." The Meeting will be held on Oct. 8 at 2.30 p.m. in the Small Hall at the Institution of Mechanical Engineers, Storey's Gate, S.W. 1. There will be a Committee Meeting at that address at noon.

Women's Gas Council

Cardiff Conference

The Women's Gas Council chose Cardiff as the venue of their first Conference, which began on Friday night, Sept. 11, with a civic reception in the City Hall.

The principal visitors were about 50 gas demonstrators who came from places as far away as Newcastle, Belfast, Exmouth, and East Surrey. The local Committee had made excellent arrangements for their entertainment.

The guests were welcomed by the Lord Mayor (Alderman G. Fred Evans) who was accompanied by the Lady Mayoress (Mrs. Evans). They were supported by the Mayor of Monmouth (Rev. W. Owen Jones), Mrs. Eric Evans, Mr. H. D. Madden (Engineer and Manager of the Cardiff Gas Light and Coke Company), Mrs. Madden, Mr. and Mrs. W. Tyce, Miss Halpin (Organizing Secretary of the W.G.C.), and Miss M. Mathias (Local Secretary).

Among others present the following were noted: The Deputy Lord Mayor (Councillor W. R. Wills); Mr. and Mrs. Rees Williams; Sir Charles and Lady Bird; Mrs. H. Bartlett; Mrs. K. Rees; Mr. B. J. Bell (District Superintendent, Cardiff) and Mrs. Bell; Mr. J. F. Rust (Assistant Engineer and Manager, Newport) and Mrs. Rust; Mr. W. Clarke Jackson (Engineer and Manager, Neath), Mrs. Clarke Jackson, Miss Jackson, and Mr. Philip Squires; Miss Newbury (Organizer of Domestic Arts in Wales); Mrs. L. Drake (Cardiff); and the ex-Lady Mayoress, Miss Kathleen Donovan.

Most of the members of the Cardiff City Council were present, and also the City Engineer and Mrs. Whitaker.

South Metropolitan Gas Company

New Tariff of Gas Prices

11d.—7½d.—4d. a Therm

The South Metropolitan Gas Company introduced on Monday last (Sept. 14) a new method of charging for gas for all consumers—apart from those whose supplies are the subject of special contracts—which will take effect from the first reading of the meter after that date.

In place of a flat rate of 8¾d. per therm on all therms supplied, which will no longer be available, the following three-step tariff is introduced:

(1) For the first step of ten therms per month . 11 d. a therm
(2) For the second step per month . . . . 7½d. ,,
(3) For all gas per month in excess of (1) and (2) 4 d. ,,

The number of therms comprised in the second step will be assessed according to a consumer's potential maximum demand and will be related to the capacity of the meter. For the great majority of consumers that number will be 10 therms; and thus, after using 20 therms, they will be entitled to all gas for the rest of the month at the low rate of 4d. a therm, or one-sixth of a penny a unit.

The full schedule of prices is as follows:

Column 1. Meter Capacity. Gas Units per Hour.	Column 2. Number of Therms Charged at 11d.	Column 3. Number of Therms Charged at 7½d. (a) Private Usage. Categories 1, 2, and 3. (See Below.)	Column 3. Number of Therms Charged at 7½d. (b) Business Usage. Categories 4, 5, and 6. (See Below.)	Column 4. Number of Therms Charged at 4d.
3	10	10	10	
5	10	10	10	
10	10	10	10	
20	10	10	30	
30	10	10	50	Unlimited after minimum monthly consumption, as shown in columns 2 and 3.
40	10	10	70	
50	10	30	90	
60	10	50	110	
80	10	90	150	
100	10	130	190	
120	10	170	230	
150	10	230	290	
160	10	250	310	
200	10	330	390	
300	10	530	590	
500	10	930	990	

Details of Categories.

Consumers are classed in categories according to the use of their premises, as follows:

(1) Premises in sole occupation of the consumer and his family for purposes of a private residence. Professional waiting or consulting rooms are included in this category when the rooms form part of the private residence.
(2) Hospitals and other institutions supported solely by voluntary contributions.
(3) Places of worship.
(4) Offices, shops, and business premises.
(5) Factories, workshops, and other industrial premises.
(6) Boarding houses and other premises let for profit, furnished or unfurnished, the occupant of which has not a contract for the supply of gas directly with the Company.

The rent of meters not exceeding a capacity of 40 units an hour (other than meters with a prepayment, or slot, attachment) will be reduced to 5d. a month.

With the inauguration of the scheme the payment of discount on accounts exceeding a certain sum will cease, since allowance for the discount has already been made in the tariff.

All accounts will be on a monthly basis.

Comparison of Old and New Charges.

Below are given examples of monthly bills under the old and new methods of charge. The category taken is the typical one of a consumer in a private residence having a meter not exceeding a capacity of 40 units an hour:

Monthly Usage.	Old Method. £ s. d.	New Method. £ s. d.
100 therms	3 12 11	2 2 1
95 ,,	3 9 3	2 0 5
90 ,,	3 5 8	1 18 9
85 ,,	3 2 0	1 17 1
80 ,,	2 18 4	1 15 5
75 ,,	2 14 8	1 13 9
70 ,,	2 11 1	1 12 1
65 ,,	2 7 5	1 10 5
60 ,,	2 3 9	1 8 9
55 ,,	2 0 1	1 7 1
50 ,,	1 16 6	1 5 5
45 ,,	1 12 10	1 3 9
40 ,,	1 9 2	1 2 1
35 ,,	1 5 6	1 0 5
30 ,,	1 1 11	18 9
25 ,,	18 3	17 1
20 ,,	14 7	15 5
15 ,,	10 11	12 4
10 ,,	7 4	9 2

From these examples it will be seen that a consumer can increase his consumption from, say, 40 therms a month to 60 therms, and still pay less than under the old method.

There is no standing charge whatever to be added to the account. Consumers will know exactly what their gas and fittings cost them without having to add on any standing or other charges.

Prepayment Consumers.

In announcing the same new scale of gas charges to prepayment consumers, the Company make an important statement which offers concessions, in the shape of a limited charge, for "slot fittings."

The Company is authorized by Act of Parliament to charge 3d. a therm on every therm supplied through a prepayment meter. This charge is intended to cover the rent of the meter, pipes and standard fittings, the cost of collection and maintenance, &c. The Government auditors scrutinize the accounts and certify every year what these services have cost the Company. The cost last year, as certified by the Auditors, was more than 3d.; but the Company charged its customers only 1¾d.

In future, instead of charging 1¾d. on every therm, the Company will charge 3d. a therm, but will limit that charge to 10 therms a month. After that the slot fittings charge will cease; and a consumer when he has used 10 therms in the month will pay only 7½d. a therm for his gas and fittings, and when he has used 20 therms will pay only 4d. a therm. At that stage he will be saving 6½d. a therm compared with the previous rate of 10½d. a therm.

This is the scale for a full slot equipment, consisting of meter, pipes, and standard cooker. Where a consumer has less than this equipment or, for instance, is purchasing his own cooker, the fittings charge will cease at a still smaller number of therms, in accordance with the following classification:

Class A.—Consumers with full equipment of meter, pipes, and standard cooker supplied by the Company:
Charge—3d. a therm on the first 10 therms a month.
Class B.—Consumers with meter and standard cooker supplied by the Company:
Charge—3d. a therm on the first 8 therms a month.
Class C.—Consumers with meter and pipes supplied by the Company, but owning or purchasing their own cooker or having no cooker:
Charge—3d. a therm on the first 6 therms a month.
Class D.—Consumers with meter supplied by the Company:
Charge—3d. a therm on the first 4 therms a month.

In no case will a charge be made for standard lighting fittings.

The slot mechanism of the meter has, of course, to be set for the first step of 11d. a therm for gas plus 3d. a therm for fittings, and therefore there will be amounts, as indicated on his bill, returnable to a consumer when that first step has been passed.

There is no standing charge whatever to be added to the account. Consumers will know exactly what their gas and

fittings cost them without having to add on any standing or other charges.

The statement to prepayment consumers gives nine examples worked out in detail for consumptions of varying amounts (for Class A) from 50 to 10 therms a month, showing the effect of the new scale. A consumer of 50 therms a month in this Class will pay, for instance, £1 7s. 11d. as compared with £2 3s. 9d. previously, and on 25 therms the bill will be 19s. 7d. against £1 1s. 10½d. At 20 therms the new bill will be 5d. more than of old, while the consumer of 10 therms, if he cannot make use of any additional gas, will pay 11s. 8d. against 8s. 9d.

The examples make it quite clear that the more gas is consumed the cheaper it becomes. For instance, the consumer who previously used 30 therms a month can now have 45 for the same money. Every slot consumer burning 21 therms a month or more will, on the same consumption, find appreciable saving on his bill for gas and fittings.

The Unit.

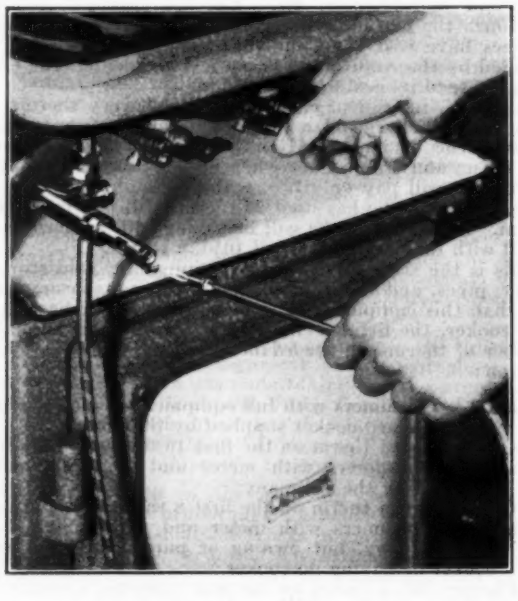
An explanatory note to consumers, in the literature announcing the tariff, shows that 11d.—the charge per therm in the first step—is the basic price fixed by Parliament for gas supplied by the Company. It also compares the gas unit of one twenty-fifth of a therm, or 4,000 B.Th.U., with the electric unit, which is equal to 3,412 B.Th.U.

The "Robolite" Automatic Gas Lighter

No Flint or Battery Required

The Parkinson Stove Company are now placing on the market an ingenious automatic lighting device which operates entirely without flints or batteries.

The "Robolite" incorporates a special platinum cold catalytic filament of enduring quality, which glows to red heat when exposed to a suitable mixture of gas and air, thus ensuring ignition. The value of this new Parkinson automatic lighter lies in its extreme simplicity. To ignite the jet, the lighter is lifted until it is nearly horizontal—held for a second or two until the gas ignites and then withdrawn from the spring clip to light the burners required. The action of replacing the head of the lighter in the spring clip and allowing the whole to swing back into its natural vertical position immediately extinguishes the flame.



The catalyst is mounted in the main housing, where it is shielded from all dirt and dust when not in use, and is only moved into the operating position when it is desired to use the torch. It is easily replaceable, when necessary, at a low cost. An adjustment for varying gas pressures is provided.

The Parkinson "Robolite" lighter is robust in construction and finished in polished chromium plate, presenting a very attractive appearance with its neat length of flexible tube. Its simplicity and certainty of operation are bound to appeal greatly to gas consumers, and it may be fitted to almost any type of cooker.

National Gas Council

Meeting of the Central Executive Board

A Meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, S.W. 1, on Tuesday, Sept. 8. In the absence of the Chairman (Sir David Milne-Watson) the Chair was taken by Alderman J. H. Lloyd, M.A., J.P., Vice-Chairman.

Coal.—An explanation of the operation of the different Coal Schemes was discussed, and it was decided to remit to the Districts certain aspects of the question for their consideration.

Calor Gas.—A letter dated Aug. 6 from the Calor Gas (Distributing) Company, Ltd., was received, stating that General Sales Companies had been set up in various areas throughout the country which would co-operate with gas companies and would, if thought desirable, relieve the gas company of all the labour and expense of selling and installation.

Town and Country Planning.—An interview was stated to have taken place on July 24 between a small deputation from the Conjoint Conference of Public Utility Associations and a representative of the Ministry of Health with regard to one or two points in connection with this subject. The interview was a satisfactory one and the assurances required on the points raised were given to the deputation by the representatives of the Ministry of Health.

Mains and Cables in Highways.—Reference was made to a dispute between a Gas Company and a County Council with regard to the interpretation of a Section in a Special Order of the Gas Company.

This Clause was in the form usually incorporated in recent Acts and Orders, and provided that if for the purpose of any highway alteration it was reasonably necessary to take up or alter the position of sub-surface works, the Gas Company might and (if reasonably required by the County Council) should alter the position of such sub-surface works at the expense of the County Council.

It was contended by the County Council that this provision gave to the County Council the right to decide whether the highway alteration was such as to render the removal of sub-surface works reasonably necessary.

The Gas Company contended, however, that the Clause meant that if the Gas Company and the County Council did not agree as to whether any removal of sub-surface works was reasonably necessary, the question should be submitted to arbitration.

The Opinion of Counsel was taken and placed before the County Council, and was submitted by them to the Ministry of Transport, who were assisting financially in the highway reconstruction. It is satisfactory to report that a settlement acceptable to the Gas Company was reached.

World Power Conference—Chemical Engineering Congress.—The financial support afforded to the Congress by gas undertakings was reported. The Congress took place at the Central Hall, Westminster, in June last, under the patronage of H.R.H. the Duke of Kent. Sir David Milne-Watson was Chairman and Dr. E. W. Smith Vice-Chairman of the Organizing Committee. A number of Papers of particular interest to the Gas Industry were submitted.

As an indication of the success of the Conference it is proposed to hold a Chemical Engineering Conference in Germany in 1940.

An Artistic Publication

New Season's List of R. & A. Main, Ltd.

There is a colourful warmth about the new season's list of Messrs. R. & A. Main, Ltd., which renders the publication very attractive to the most casual glance. Printed on art paper, the text is liberally illustrated, and opposite to many of the descriptions of fires listed a colourful illustration of a typical setting for the particular fire is shown. The reader is thus given both an idea of how the fire will look when installed and a helpful suggestion of the type of fire most suitable for his requirements.

The list comprises fifty-six pages. After a general description, by way of introduction, of the "Duramain" radiant, of how to find the number of radiants required for heating any size of room, and of how to determine the gas consumption of fires having from five to twelve radiants, the list describes the "Panamain" fire. This model is specially appropriate to modern decorative schemes as it can be obtained in a choice of special finishes. Then follow the "Starmain," which is very suitable for fixing in panel or wall fitting at any height above the floor. The "Gloria" fire offers distinct possibilities to the

architect and builder in his decorative treatment of the fireplace. The portable models are next described, and these include the "Newscreen" and the "Mainscreen," which can be obtained with switch control. The "Crichton," it is claimed, by reason of the special design of its radiants, the gas consumption can be varied, without loss of efficiency, from the standard rate of 2,200 B.Th.U. per teat per hour to 3,000 B.Th.U., thus making the seven-radiant model equivalent to a nine-radiant fire for standard design.

Then follow the "Shakespearean" series, which embraces models suitable for mantel recesses or tiled surrounds, and also for round and square top designs, with or without dogs, for building in if desired. The "Author" series is suitable for building in or for placing in front of existing coal grates; "Duplex" burners are provided. The centre pages of the list are devoted to a chart of the "Main" colour paint finishes in duotone art and high-grade colours.

Other models described include the "Cinderella"—"the gas fire which looks like a glowing coke fire"—the "Entente," the "Plaquetta"—a very smart modern flush-fitting production—and the "Harmonic" and "Nomadic." The list is concluded by descriptions of panel heaters, radiators, the "Mainspear" gaslighter, and "Main" gas fires for use with "Calor" gas.

Pessimism Unwarranted

Domestic Lighting Success at St. Austell

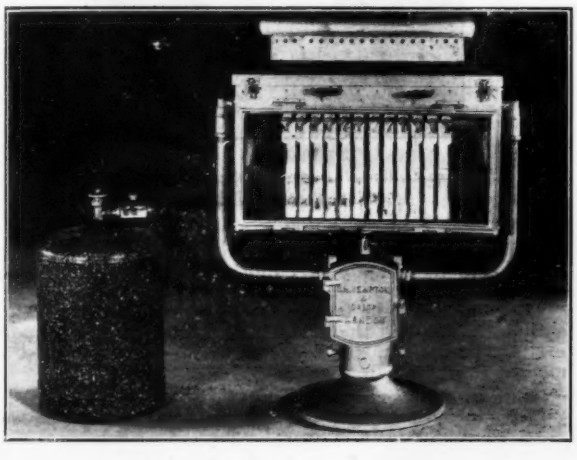
Pessimism regarding the gas lighting load seems quite unwarranted in the light of the recent experience of the St. Austell Gas Company who were kind enough to forward us the following significant facts:

Thirty-seven Council houses were recently built in their area. The Urban District Council, while allotting the lighting to the Electricity Company, allowed the Gas Company to install points in the ceilings.

As a result of a canvass of prospective tenants 31 out of the 37 houses were fitted with gas lighting; four adopted electric lighting; and two declined to install either service.

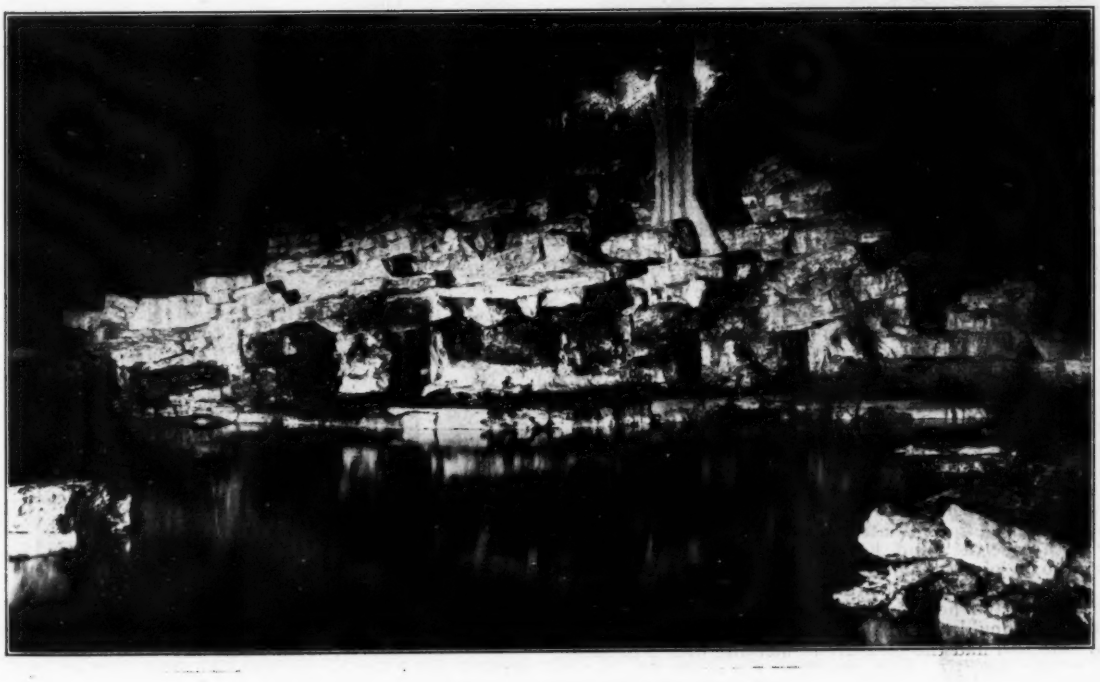
Mr. J. C. Cotterill, Engineer, Manager, and Secretary, expresses the hope that this success will be of encouragement to other similarly placed undertakings.

Calor Gas for Floodlighting



Installation at the Zoological Gardens

The suitability of Calor gas for floodlighting in situations where it would be difficult to carry the ordinary mains is indicated by the photograph below, taken recently at the London Zoological Gardens. The distance from the light source to the rocks was fully 150 ft., and the lamp employed was the "Kempar" 12-light unit shown, along with the Calor gas container, in the photograph on the left. The whole effect was excellent.



North British Association of Gas Managers

The 75th Annual Meeting of the North British Association of Gas Managers was held in the Town Hall, Kirkintilloch, on Thursday, Sept. 10—the PRESIDENT (Mr. James Dickson, of Kirkintilloch) in the chair.

Provost ROBERT HUDSON, J.P., welcoming the members to the ancient burgh of Kirkintilloch, said he hoped their deliberations and interchange of opinions would prove helpful and that when they returned to their homes and their work they would carry back with them many happy memories of their visit. They were proud of the history, lineage, situation, and industry of Kirkintilloch, which had an individuality of its own. He was sure that this meeting, under the able guidance of their Gas Manager, Mr. Dickson, would be of outstanding merit. Notwithstanding what some people said, there was a great future before the Gas Industry. On behalf of the Town Council and community he welcomed them to Kirkintilloch.

The PRESIDENT, on behalf of the Association, thanked Provost Hudson for his warm welcome. It had been his privilege to serve under the Provost for a number of years, and he appreciated the worth of their civic chief and the magistrates. Continuing, the President said that the passing years brought changes and he regretted to record the death of four of their members—namely, Mr. John Lang (Vale of Leven), Mr. Dugald Currie (South Shields, and formerly of Stirling, Belfast, Airdrie, and Nelson), Mr. Gregor M. Henderson (Bonnyrigg and Lasswade), and Mr.

The President of the Institution and Mrs. Lacey with Mr. and Mrs. Dickson.

John Anderson (of Alder & Mackay, Ltd., Edinburgh). Those present stood for a moment in respect to their memory.

The HON. SECRETARY (Mr. Archibald Kellock, Airdrie) intimated that apologies had been received from Mr. J. R. W. Alexander (Secretary of The Institution of Gas Engineers), Mr. W. D. Rowe (Manager of the British Commercial Gas Association), the Presidents and Secretaries of kindred Associations, and from various members of the North British Association.

The PRESIDENT said they were honoured that day with the presence of Mr. Stephen Lacey (President of The Institution of Gas Engineers), whom he had pleasure in inviting to say a few words.

Mr. LACEY, who was cordially received, thanked the members for their warm welcome. As President of The Institution of Gas Engineers, he appreciated to the full the work of the district Associations in affiliation to the Institution. Their Association was an old one, as this was their 75th meeting, and he was therefore all the more pleased to be with them. Many of their members were also members of the Institution, travelling many miles to its meetings, and he therefore thought it only right and fair that he should return the compliment and come to see them. He had had the pleasure of meeting their President

Mrs. George Keillor with Mr. J. S. Smith (winner of the Golf Trophy) and Mrs. Smith.

and Secretary on their recent enjoyable trip to the Isle of Wight and had gladly accepted their invitation to come North.

The minutes of the last meeting were taken as read.

It was intimated that, in addition to the names appearing in the report, the following had been admitted to membership:

Ordinary Member.—Mr. Adam C. Finnie (Duns).

Extraordinary Members.—Mr. James B. Brown (Stonehouse) and Mr. James Taylor (Glasgow).

Gift from J. W. Napier.

The SECRETARY read the following letter from Mr. J. W. Napier, of Alloa:

"I desire to give a sum of one hundred guineas to the Benevolent Fund of the Association in memory of

Provost Robert Hudson, of Kirkintilloch.

my late wife and as an evidence of her often expressed feelings in regard to the Fund.

"In that she was helpful in forwarding my career in the profession, she was not unmindful of the circumstances and needs of others and because of her many sympathies and joy of giving I desire this gift to commemorate her sense of gladness and duty.

"I shall feel grateful and appreciative if the Association will accept my cheque herewith."

The PRESIDENT said he was particularly grateful and appreciative because Mr. Napier had made this gift in his (Mr. Dickson's) year of office and it would mark this visit to Kirkintilloch in years to come. The Association was deeply indebted to Mr. Napier for his magnanimous gift. There was no better way of expressing appreciation of somebody else than the method adopted by Mr. Napier, who had perpetuated the memory of his wife in the Association. It was not so long since the late Mrs. Napier had been with them at St. Andrews, charming them all with her gracious personality. In the name of the Association he desired to express thanks for the gift.

Mr. KELLOCK said he wished to add his testimony to what had been said regarding Mrs. Napier, who had been a good friend to those who had been trained under her husband.

Certificates.

The President then presented the following certificates:

Gas Engineering—External, 2nd Class: T. McDougall (Selkirk).

Gas Engineering—Internal, 1st Class: A. Brown (Leven); T. B. Livingstone (Alloa); A. A. Mitchell (Dunfermline); T. P. Napier (Kirkcaldy).

2nd Class: J. Cowper (Leven); D. W. Davidson (Dunfermline); H. G. Keillor (Greenock).

Gas Supply—External, 1st Class: S. T. Jones (Falkirk); J. R. Denoon (Leith); W. Rose (Kilmarnock).

It was announced that Mr. Douglas W. Davidson had also gained the Cartwright Holmes Scholarship, entitling him to proceed for three years' study to Leeds University.

The PRESIDENT then delivered his Presidential Address, which will be found on other pages of this issue.

The Papers by Mr. M'Isaac and Mr. Barker were then presented. The latter will be found on other pages of this issue, while the former will be published in next week's issue of the "JOURNAL."

Election of Office-Bearers.

The SECRETARY stated that the Scrutineers had reported that Mr. H. A. Aitken (Leven) had been elected Junior Vice-President; Mr. George Braidwood (Coatbridge) would become Senior Vice-President; and Messrs. R. M. Simpson and T. S. Lockhart had been elected Members of Council for a period of three years, and Mr. P. Low (Elgin) for one year.

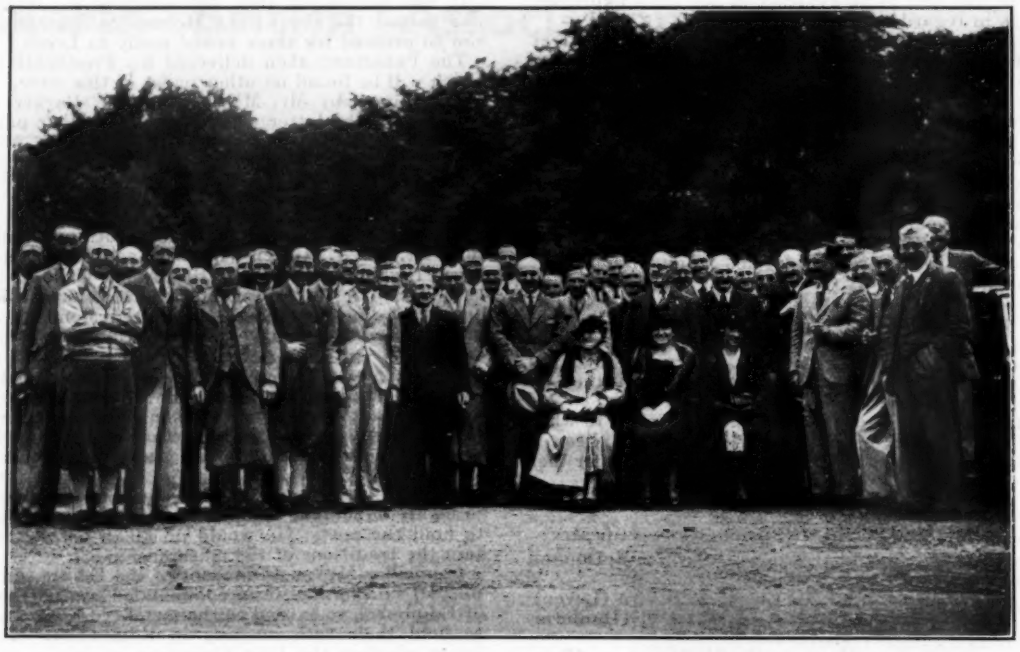
The PRESIDENT congratulated Mr. J. Jamieson, his successor in office. The Association, he said, appreciated his work. As a West of Scotland man he was glad to know that he occupied such an important position in the East of Scotland. He wished him all success during his year of office.

The PRESIDENT-ELECT said it was a great pleasure to be so highly honoured. He was the sixth Edinburgh Engineer to hold the post. He would do all in his power to maintain the traditions of the office.

Councillor MUTER (Convener of the Edinburgh Gas Committee) said he had been commanded by the Lord Provost of Edinburgh to extend to the members a hearty invitation to hold their 76th meeting in Edinburgh. He did not know whether the City Chambers would be available or not, but they would make adequate arrangements to ensure the success of their meeting.

The PRESIDENT thanked Councillor Muter, and remarked

These and other snaps were taken on the boat and at Inveraray, which the N.B. Association visited last Friday. Inveraray Castle, seat of the Duke of Argyll, is seen in the upper photograph.



Members of the North British Golf Circle (photographed by the "GAS JOURNAL" by special request).

that members would look forward with great expectations to 1937.

Mr. G. BRUCE (St. Andrews), Past-President, in presenting Mr. Dickson with a memento of his year of office, said they had had a conscientious President, not only at the meetings, but behind the scenes. He would now join the ranks of the "ex-service men," not as a spent force, but as one who kept his interest in the Association. He wished him health and prosperity and many a kindly thought about the happy time spent in Kirkintilloch.

The PRESIDENT said this had been an outstanding event in his life. He had been doubtful regarding his ability to fill the post, but if he had succeeded in any measure he was satisfied. He would cherish the memory of his year of office and would be reminded of it every time he saw that memento, which would be handed down to his posterity.

Mr. A. S. NISBET (Paisley) proposed an omnibus vote of thanks. To all responsible for the arrangements, especially Mr. Kellock, he tendered hearty thanks in their name.

Mr. KELLOCK briefly replied.

LUNCHEON.

At the invitation of Kirkintilloch Town Council the members were entertained at luncheon in the Miners' Welfare Hall—ex-Provost J. R. RUTHERFORD, J.P., presiding.

After the Loyal Toast, the CHAIRMAN proposed the toast of the North British Association of Gas Managers. The toast, he said, should be honoured by the members of the Association itself and also by those of them not so conversant with its functions and the value of its work. The Association originated in Fife, where the people placed a great deal of importance on independence. The fact that the Association had its beginning in that attractive area made it clear that it would be only a matter of time ere the local organization became representative of all Scotland. That had happened, and the Association was not only influential in Scotland but, by reason of its affiliation to The Institution of Gas Engineers, exercised a far-reaching influence on the wider aspects of the Industry.

Science marched on from year to year, bringing new and manifold changes. Their problems were best solved by exchanging experiences. The public could not estimate the value of such an Association. Their President had given them a comprehensive review of the progress and development of the gas undertaking in Kirkintilloch. In their own experience in that town they had had ample evidence of the value of the work of their Association. He could not speak from a technical point of view, but as a layman there were certain things he could say. In 1907 when the present Kirkintilloch Gas-Works were erected, they used 6,200 tons of coal to produce 58,000,000 cu.ft. of gas. Last year they made 186,000,000 cu.ft. from 8,200 tons of coal. In 1907 the average price of coal was 8s. 10½d. per ton against 17s. 6d. last year, and yet during these years they had increased the wages of employees, improved their conditions, seen the standard of the Industry raised substantially in every direction, and yet were to-day producing gas at 5d. per 1,000 cu.ft. less than in 1907. This he attributed to the march of science, of which they had taken full advantage, and also to the energy, initiative, knowledge, and experience of their President, their Manager at Kirkintilloch.

Apart from these local matters there were wider aspects of the Industry on which he would say a word. As a result of the Coal Mines Act, no one would grudge the increase in the price of coal if it meant an improved standard of living for the miner. Their Association wished not only to protect itself but also the public interest and he was glad to hear that as a result of their influence and of the influence of other Associations there would be some modification of the Act which would benefit both themselves and the general public.

The Proposed Gas Grid.

Dealing with the proposed Gas Grid for the West of Scotland, the speaker said that the Committee appointed by the Board of Trade had been carefully considering some way of regulating production in order to get more satisfactory results. He could not offer any definite opinion, but there was a difference between theory and practice. It was possible to arrive at a certain conclusion on paper which did not work out in actual practice. Lanark County Council had tried co-ordination unsuccessfully. The Council now supplied the area previously served by Uddingston and Cambuslang, and throughout the whole area under its jurisdiction the price ranged from 4s. 6d. to 5s. 3d. per 1,000 cu.ft., but when Uddingston supplied its own area the price was 2s. The Committee would require to see that any scheme would be of advantage to all concerned, and no doubt this matter would come under the scrutiny of the Association. He wished it health and prosperity and coupled the toast with the name of Mr. Dickson, whom they regarded with respect and admiration in Kirkintilloch.

Mr. JAMES DICKSON, responding, said he was exceedingly pleased to be in the service of such a progressive body as Kirkintilloch Town Council. Mr. Rutherford had given them a clear outline from the layman's point of view and had defined certain lines helpful to them in connection with the future of their gas undertakings. When he took office, said Mr. Dickson, he was afraid he might not be able to carry out the duties as he should, for they had had many eminent men as their Presidents and the difficulty was to continue to maintain the high traditions of the office. He had been greatly encouraged, however, by his Gas Committee and Convener, and when the Town Council knew that Kirkintilloch was to be the venue of their meeting they saw to it that every cloud on the horizon would disappear. On behalf of the Association he thanked the Chairman and assured him that the points he had mentioned would be duly considered by them.

Bailie GILLIES, proposing "Our Guests," said that Rochefoucauld once stated that the ideal speech lasted three minutes and that all that needed to be said could be said in that time. They were greatly honoured by the Association's visit and by the fact that their Gas Manager was their President. The longer one was in the Town Council the more one realized that the permanent officials did the work. The officials in charge of their trading departments did valuable service and made great contributions to the rates and to the general prosperity of their communities. He sometimes thought that his colleagues were not so grateful as they should be to the men who ran their gas enterprise. The Gas Department was the most important part of the municipal machine. They had to apply to the Burgh Treasurer for advice on finance, to the sanitary inspector for information on sanitation, to their Town

Clerk for legal help, but the omniscient Gas Department threw light on any subject.

Custodians of the Public Interest.

Councillor WALTER MUTER (Convener of the Edinburgh Gas Committee), in the course of his reply, said there was a tardiness on the part of coalowners to bring into being the Consultative Committees foreshadowed in an earlier stage of the negotiations. The Gas Industry, in common with the Electricity Industry, could not continue indefinitely to pay artificial prices for its raw materials. They in the Gas Industry were not looking on the question of raw materials in any biased way, but they were custodians of the public interest. The coal trade must realize that the day was not far distant when there must be a complete revision of prices. Artificial prices must of necessity be translated into increased costs for the public. However hardened the coal trade might be, he advised them to set up the Consultative Committees as soon as possible, put all their cards on the table, and let large consumers know the economic price needed to give a fair return to owners and hewers of coal alike. They in the Gas Industry could only view the present position with suspicion. The Government, the owners, and the men were combining to squeeze as much out of public utilities as they could, and they might have to approach Parliament soon to have their protection assured. Councillor Muter concluded by thanking the Provost for the hospitality of his ancient burgh.

Mr. STEPHEN LACEY, speaking for those South of the Border—many of them Scotsmen—said he agreed with the Chairman when he said that the North British Association had done much good to the Industry as a whole. Like other Associations, it did work complementary to that of the Institution.

Mr. GEORGE BRAIDWOOD, proposing the toast of the Chairman, said that ex-Provost Rutherford had disclaimed all technical knowledge, but it was evident from his remarks that he was able to dictate the policy of an undertaking. He had discussed the Coal Bill. It had been said that the coal masters had not asked them to consult with them, but when the Committee was formed, with a neutral Chairman, they in the Gas Industry would get a fair deal. They had not yet received the report of the Gas Grid Commission but he did not believe it would be as drastic as they anticipated. Ex-Provost Rutherford's father, said Mr. Braidwood, had been Provost of Kirkintilloch from 1890 to 1893. Their Chairman was a well-known public man who took a great interest in public affairs, in the Convention of Royal Burghs, and in Dumbarton County Council of which he was Vice-Convener. He asked the company to drink his health.

Reception.

At a reception in the evening the guests were received by Provost and Mrs. Hudson, the former extending a welcome to those present. In Kirkintilloch, where the original Company had been taken over by the Gas Commissioners and then by the Council, they had had men of character and ability as managers and Mr. Dickson stood worthily in that succession. He had made a special study of gas accountancy and they had had the benefit of his knowledge and experience. They were also the first town in Scotland to install a benzole recovery plant. In spite of competition from electricity their gas make in Kirkintilloch last year was a record in their history. He trusted that from every point of view they would carry away happy memories of their stay in Kirkintilloch.

The PRESIDENT thanked the Provost and Town Council for the support given him in his year of office. The Association members would go with happy memories of Kirkintilloch as a place with a character of its own.

A first-rate concert and dancing followed.

The Golf Circle.

The Autumn Competition was held over the Cawder Golf Course, Cadder, on the Wednesday. The course is only a few years old and there had been much rain to make the going heavy; but the weather held good, and over fifty members of the Circle had an excellent day's sport. The scores were very good, considering the difficulty presented by a number of hidden greens. The Challenge Bowl and Memento were won by J. S. Smith, Glasgow, with 90 – 14 = 76. The complete prize list was as follows:

Section 1.

[Handicaps up to 11 inclusive.]

	1st	W. C. Campbell, Buckie
	2nd	A. Cuthbert, Stirling
	3rd	Jas. Brock, Glasgow
Tie	4th	P. Blackhall, Edinburgh
Tie	5th	R. Sturrock, Ardrossan
Tie	6th	S. Hall, Edinburgh

Section 2.

[Handicaps over 11.]

	1st	J. S. Smith, Glasgow
	2nd	C. Hamilton, Loanhead
Tie	3rd	W. B. Hudson, Manchester
Tie	4th	T. S. Lockhart, Rothesay
Tie	5th	Alex Jamieson, Johnstone
Tie	6th	D. Fulton, Helensburgh
Tie	7th	A. Brown, Edinburgh

After play, a group photograph was taken (in the gloaming) by the "JOURNAL," and the Annual Meeting of the Circle was held; Captain David Fulton in the Chair. Mrs. Dickson graciously presented the prizes, and Mr. Dickson (President of the Circle) said a few words. Then the Minutes of the last General Meeting (at St. Andrews) were read, and the accounts were found to be in a very healthy state.

Important alterations in the constitution of the Circle were proposed by the Committee. These related to Officers, Membership, Handicaps, and Classes for competition play; and they were adopted after a notably brief discussion. Three new members of committee were elected; and it was announced that in order to ensure some continuity of management, Mr. Fulton had consented to offer himself for another year's Captaincy. He was re-elected with enthusiasm, as was Hon. Secretary and Treasurer Scott.

Presentation of a Past-Captain's Badge to Mr. Walter Hudson and a vote of thanks to the Cawder Club closed the proceedings.

The Bowling Club.

The draw of the Annual Competition of the North British Association of Gas Managers' Bowling Club took place at Kirkintilloch Bowling Club Green on the Wednesday at 2 p.m., when 4 rinks of players took part. Two rinks were 8 shots up, and so an extra end was played, resulting in the winners as follows: Thomas Shearer (Glasgow), A. H. Dunlop (Glasgow), James Meek (Kirkintilloch), and Skip, James Cochrane (Darvel).

Second prizes were also presented to: James Muir (Galston), E. Shiell (Thurso), Provost Hudson, and Skip, William Mann (Stevenston).

The prizes were presented by Mrs. James Dickson, called upon by the Bowling President, Mr. James Smart, of Monifieth.

Ladies' Golf.

There was an excellent attendance at the Ladies' Competition, which was held on the Allander Course of the Hilton Park Golf Club, Milngavie.

Miss Ritchie, Falkirk, won the custody of the Handley Salver and prize of a golf club gifted by Messrs. Cairns and Emerson. Miss Handley, Elland, returned the best scratch score (prize by Mr. Clifford King); and Mrs. Campbell, Buckie, won the Hidden Holes Competition (prize by Mr. J. W. McLusky).

Inveraray.

The excursion on Friday was by the fast and comfortable T.S. "Duchess of Argyll," from Wemyss Bay to Inveraray, where an hour was spent on shore. Many members and their ladies took part and thoroughly enjoyed the trip, which was favoured with fine weather.

The party finally dispersed at Glasgow Central at 7 p.m., feeling that Mr. and Mrs. Dickson had presided over a meeting successful in every way, during which they had earned the gratitude of all.

Gas Meter Testing at Glasgow

Report of the Statutory Inspector

The report of the Statutory Inspector of Gas Meters, Mr. Alex. D. Farquharson, to the magistrates of the City of Glasgow for the year ended May 31, 1936, states that the total number of meters tested during the year was 35,043, and the amount of fees collected was £2,308. These figures are an increase on those of 1935. Of the total number of meters tested 14,013 were new meters, 20,663 were repaired meters, and 367 were submitted on behalf of gas consumers for certification as to correctness.

A statement of meters tested and fees received for the past ten years shows that while in 1927 the number of meters received was 25,122, in 1936 the number had reached 35,043. The fees received have also increased from £1,574 in 1927 to £2,308 in 1936.

Of the new meters tested (14,013) an analysis of faults and errors in those rejected states that the following causes were responsible: More than 2% fast, 110; more than 3% slow, 33; passing gas without registering, 9; ceased to register (bound), 1; leakage, 5; undue oscillation, 6; other faults, 5; total rejected 169, or 1·2%. Of the total repaired meters tested (20,663) the following were the causes for rejection: More than 2% fast, 148; more than 3% slow, 138; passing gas without registering, 15; ceased to register (bound), 17; leakage, 5; undue oscillation, 15; excessive absorption of pressure, 12; other faults, 9; total rejected 359, or 1·7%. Of the meters submitted for certification: 135 were more than 2% fast, 42 were more than 3% slow; 5 passed gas without registering; 1 ceased to register (bound); 4 were leaking; 27 oscillated unduly; 8 developed other faults; total rejected 222, or 60·5%.

North British Association of Gas Managers

Presidential Address

of

JAMES DICKSON,

of Kirkintilloch

The President

Presented at the Annual Meeting held at Kirkintilloch on Sept. 10

Kirkintilloch has for a great many years maintained a reputation for selling cheap gas, and on that account I wish to deal with some of my experiences during the past nineteen years in the management of the works here.

The present works at Back o' Loch were completed in 1907, and commenced making gas that year. At that time the old works, situated in the lower part of the town, were considered incapable of meeting the ever-increasing demand for gas, and in order to safeguard against any possible failure in supply, an addition was made to the carbonizing bench during the last year the works were in operation, bringing the number of retort settings up to seven. These consisted of eight retorts in each setting, and were all in use during the winter months previous to the works closing down.

I have mentioned this fact so that the progress made in carbonizing since then might be emphasized. In 1907 the annual make of gas was 58,738,000 cu.ft., with a maximum daily load of 300,000 cu.ft. In order to allow for future increase in gas consumption, the new plant was constructed to provide for a maximum daily make of 500,000 cu.ft., and consisted of twelve settings of horizontal retorts, each setting having eight retorts, and complete with its own regenerative furnace. These were built six settings on each side of the bench, or back to back.

Our railway siding passes in two lines through the retort house building, and divides the coal stores from the retort house proper. By this arrangement coal handling costs are reduced to a minimum, as the stokers fill their coal bogies direct from the railway wagons.

During the year 1921 I installed in the retort house a water gas plant, which has a capacity of 360,000 cu.ft. per day. This was erected in a portion of the coal store on the east side of the building. In deciding upon the position and space to be allowed for this plant, care was taken to economize in floor area, providing for additional plant, if such should be required at a later date. Owing to the success of the first plant, and the continued rise in our gas output, it was again necessary to add to our plant, and in 1926 I installed a carburetted water gas plant, embodying the back-run process. This was the first plant of its kind to be erected in Scotland. When making blue water gas this plant has a capacity of 730,000 cu.ft. per day, but if used as a carburetted water gas plant, the capacity can be increased to 880,000 cu.ft. per day, depending upon the amount of oil used.

So far as the coal carbonizing plant is concerned, beyond retort renewals and some modifications of the regenerators, the bench is unchanged since its erection in 1907. The modifications which have been made were the result of tests extending over a period of years, and to arrive at conclusions three settings were rebuilt at the same time, but to slightly different dimensions. As a result of this, I was astonished to find that very slight differences in flue dimensions altered the working results, and what helped to confirm the conclusions I arrived at was the outcome of a mistake in the size of retorts supplied by one firm. These were smaller than they should have been, and for over two years the working results from that particular oven were poor, but after the lapse of this time we found that a growth had been accumulating in the flue passages which convey the gases round the retorts, and it was only when the passages had been sufficiently restricted in size that we were able to obtain the temperatures similar to other settings. My experience in these matters convinced me that in order to get the best out of a setting it is necessary to maintain a fairly active movement by the gas in its flue travel.

Attention to Producers.

Particular attention was given to the dimensions of the producers, and here again, as a result of experiments, I have reached a higher standard of efficiency, which has resulted in a lower coke consumption in the producer furnaces. Important, however, as are the points mentioned, what is even more so is the regular handling of the producers, and in this respect success depends upon the person in charge. The practice which had been carried out with us in the handling of the producers was to distribute the fire cleaning among the day shift stokers; but as this meant a change of personnel each week with the change of shifts, I found it unsatisfactory. I decided, therefore, to relieve the stokers of this duty entirely, and for this work I engaged an additional man. This innovation has paid the works most handsomely. Now the temperatures are maintained without the variation formerly experienced; coke is saved in the producers; gas is more regular in quality; and the retort settings, because of the more regular heating, have a greatly increased life. Hitherto with us it was considered that a setting of retorts, after working three years, had served its day. Only this summer I ceased to work three settings of retorts which had given unbroken service for eight years.

From the retort house the gas travels through our air-cooled condensers. These are built in two sections, but are so provided with valves that any quarter section of the whole can be used separately, or built up in such units to full capacity. While these are normally capable of dealing with half a million cu.ft. of gas per day, now that water gas is used to the extent of about 50%, and this gas is cooled before being mixed with the coal gas, their capacity becomes automatically increased, and that without spending capital for this purpose.

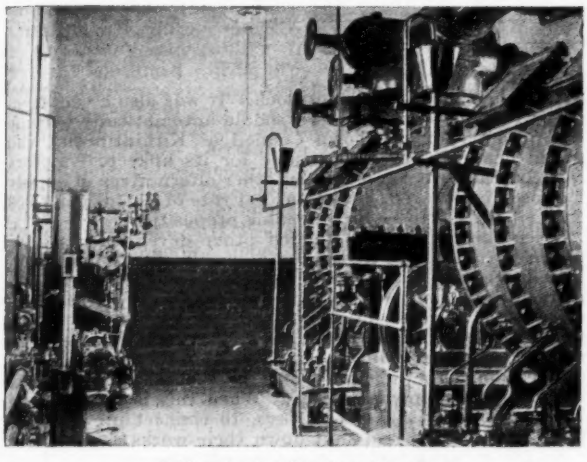
Despite the fact that our maximum daily output is now over 900,000 cu.ft. per day, we still find these ample in capacity. This advantage is largely obtained because of the water gas plant.

From the condensers the gas passes on to the exhauster house, where are installed two exhausters, each with a capacity of 90,000 cu.ft. per hour. After leaving the exhauster house, the gas travels on to our tar extractor and Livesey washer. This plant was largely constructed to my own design, as the washer section was at one time part of a combined scrubber and washer. The rise and fall in the gas main permits the liquid leaving the nozzle at the top of the down pipe to have sufficient contact with the gas to remove the tar in its travel downwards. It is a feature of this plant that the liquid from the Livesey washer is circulated by means of a pump constantly in action, which also gives the desired pressure at the spray nozzle. The construction of a suitable jet is the key to the success of this plant, and was achieved after many attempts. The spray as it leaves the jet must not spread at too quick an angle, but in passing downward must maintain contact as long as possible with the gas. The jet is made from a piece of malleable iron tube, tapered at its outlet to form a spray nozzle, and depending upon the length of the taper, the spray angle will either be slow or acute. Inside the tube is inserted a piece of square iron which has been twisted into a spiral form. The result is that the liquid leaves the jet in a very fine spray, and forms a most effective tar remover. Either tar or liquor, or a mixture of both, can be used as the liquid medium.

Tar, I believe, is most effective. The efficiency of this plant as a tar extractor is best shown when I say that scarcely a trace of dark liquor is to be found in any of the sections of the scrubbers which follow. Other advantages which result from this plant are (1), there is no back pressure from its working, and (2), the liquor used is greatly strengthened in its ammonia content, assisting thereby the work of the scrubbers. It may interest you to know that my first experience in the efficiency of this plant was when we used it at the inlet of the condensers, and so

effectively did it remove the tar that after a few hours' working the exhauster completely seized because of the loss of tar in the gas which had acted as a lubricant. Although it was sought to overcome this trouble by increasing the oil lubrication to the exhausters, the difficulty experienced led me to abandon its use at this stage in the manufacturing process.

The scrubbers were erected by Messrs. W. C. Holmes & Co., Ltd., in 1927, and have a capacity of 1¼ million cu.ft. per day. The combined scrubbers and tar extractor are completely housed in, and are thus protected from all kinds of weather, which makes for greater efficiency. This also enables the attendant of the plant to do his work under comfortable conditions. The only objection which arose from the housing of the scrubber was the existence of the seal pots within the building. On two occasions I was made to realize the danger of this. A sudden stoppage at the works took place, and the back pressure relieved itself at the tar extractor seal pot and filled the building with gas. This danger, however, has now been overcome by removing the seal pot to a position outside the building.



A View in the Scrubber House.

The purifiers consist of five boxes, 20 ft. square. These are dry-sealed and almost completely housed in. The gas temperature is controlled by means of a "Triumph" heater (made by Messrs. Clapham Bros., Ltd.) situated at the outlet of the scrubbers, and also by means of external pipes run in three lines under the purifier boxes. For this purpose the exhaust steam from the exhauster engines, the scrubber engine, and tar extractor pump is collected in a trunk main, which in turn is connected with the pipes mentioned. The spent oxide, as it leaves the purifier house, is passed through an oxide breaker, driven by a gas engine, and thereafter stored in the open yard to be further handled.

Ordinarily the gas would pass from the purifiers to the station meter and into the holder, but two years ago Messrs. W. C. Holmes & Co. erected for me the first complete "Dri-Gas" plant, benzole, and naphthalene extractor in Scotland. Since then this plant has functioned most satisfactorily. When I considered the introduction of this plant, the difficulty I wished to overcome was the outside complaints resulting from naphthalene in the mains and service pipes. So far as benzole was concerned, its recovery was incidental to naphthalene removal. I realized that with 50% water gas our returns from benzole would be much less than if we dealt with straight coal gas only. However, such benefits that would accrue from the recovery of benzole I felt could be taken full advantage of. After 2½ years' experience in the working of this plant, I can say that its success in completely overcoming our naphthalene troubles has been sufficient justification for its installation, apart from other advantages. In the six months preceding the installation of this plant, complaints arising out of naphthalene chokages had assumed alarming proportions, and at times, in severe frosty weather, it took the whole of our outside staff, *plus* additional men from the works, to cope with the situation. For a works of our size, 8 to 10 men on complaints of this nature at certain periods was a very serious matter. Now we have no complaints whatever from naphthalene causes.

So far as benzole is concerned, its recovery, as I have said, is incidental to naphthalene removal, and if necessary it can be returned again to the gas by way of the scrubber. On several occasions, when we have been short of gas, we have followed out this practice, but I do not consider this a very satisfactory way of restoring to the gas any of its lost energy. The amount of benzole which may be recovered varies with us up to three gallons per ton of coal carbonized. During the past summer we were recovering the maximum in order to keep our calorific value down to standard. We were then working more retorts than was necessary to provide gas for our requirements, but to have dropped an oven with eight retorts would have left us short of gas. It was, therefore, profitable to work our ovens full and reduce the calorific value of the gas by benzole removal, and also reduce the proportion of water gas in our town's supply. Incidentally, coke was then very scarce with us, and commanded a good market price, so that by increasing our output of coke and benzole we materially assisted in reducing our manufacturing costs.

The recovery of benzole in a works where the town gas supply consists of 50% water gas presents a problem of its own. The more the calorific value of the coal gas is reduced, the less will be the proportion of water gas that can be used in the general mixture if the declared calorific value is to be maintained. The plant, nevertheless, is a most useful adjunct in helping to get the highest possible efficiency and service from the general process of gas manufacture.

To measure the gas made in the works I installed a "Connersville" station meter in 1930. This is ample in size for future requirements, and now that a "Dri-Gas" plant is installed, it is an ideal instrument in maintaining a low moisture content in the gas.

From here the gas passes on to our spiral-guided gasholder, which has a capacity of 500,000 cu.ft., and was erected along with the works in 1907.

My predecessor erected a holder of the column-guided type which has a capacity of 150,000 cu.ft. There were several reasons which justified the erection of this holder then, chief among which was the condition of the side sheets of the spiral holder and the effect upon the holder foundations of the workings from an adjacent colliery.

One of my first duties as Manager was to maintain a close vigil upon the working of the larger holder and to endeavour to combat the corrosion, particularly upon the side sheets of the lower lift. After continuing the usual practice of scraping and painting without effective results I decided to oil-film the tank. It is now sixteen years since this was started, and every year we add about 300 gallons of oil to our tank to make up for loss. That this has been a success is beyond dispute. Corrosion has stopped in the parts vitally affected previously, and the holder in every way works much more smoothly, owing to the oil lubricating the guides and the rollers in its ascent. Hundreds of pounds have been saved in scraping and painting since then, and, apart from these savings, we have provided in the holder a means of maintaining a dry gas, which, of course, has become now a necessity if we desire to get full advantage of our "Dri-Gas" plant. Since the introduction of our first water gas plant, the column-guided holder referred to has been used exclusively for the storage of water gas, and is treated similarly regarding an oil film.

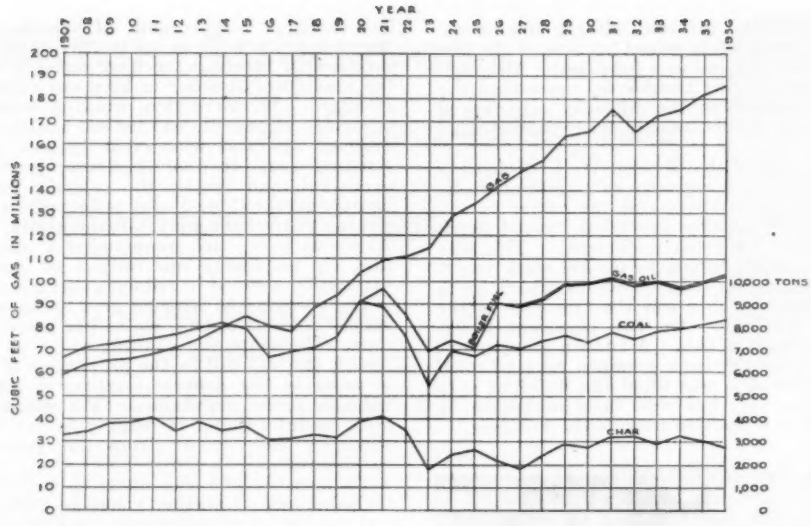
Residual Products.

Having continued to carbonize with horizontal retorts, our residual products possess several advantages which retain for us a ready market for them. There is no restriction as to the class of coal we may choose to carbonize, and no matter how strongly caking the coal is, it is easily dealt with. This is particularly suitable to us, since we are situated in the best coking coal area in Scotland, and in consequence our char maintains a high reputation. Similarly with our tar, owing to its high carbon content and to the fact that viscosities of any range can easily be obtained when distilled in our tar plant, we not only find a ready market but get a price somewhat above the ordinary standard. So is it with the oil distillate from our tar. Here again, our oil is particularly suitable for the manufacture of certain disinfectants, and our chief difficulty is to supply sufficient bulk to satisfy certain buyers. The other products we have are easily disposed of. These are light naphtha, naphthalene crystals, and crude benzole.

In order to deal with our ammoniacal liquor, we continue to make sulphate of ammonia, and while we may not show much profit from its manufacture, still, with no suitable outlet for the disposal of liquor but with a building and plant in good order for the manufacture of sulphate of ammonia, I am glad to think that we are not incurring any loss.

Having described our plant and its processes, it may be of interest to indicate the results we obtain in gas and char yields per ton of coal carbonized, and as a fair statement I am quoting figures which are the average for the past five years.

Gas made per ton of coal carbonized . . .	22,170 cu.ft.
Therms per ton of coal carbonized . . .	99·99
Coke for sale	7·5 cwt.



As an illustration of the development of our works since the year 1907, the gas output has risen from 58 million cu.ft. to 186 million cu.ft. With this increase in output the coal used in the production of gas shows only an increase from 6,600 tons to 8,300 tons, the comparative yield of gas per ton of coal carbonized being for these years 8,827 cu.ft. and 22,170 cu.ft. The amount of salable coke shows very little decrease over these years. This is due to greater efficiency in the retort house and a wise selection of highly coking coal. The coke sold in 1907 was equal to 9·9 cwt. per ton of coal carbonized compared with the present average of 7·5 cwt. It is only fair to add, however, that since the introduction of the water gas plant steam has been used in much greater quantities in the process of manufacture, and instead of supplying the necessary fuel for steam raising from coke breeze produced at our works as formerly, we now have to purchase boiler fuel. This additional cost is not due entirely to gas manufacturing costs, but is to some extent the result of additional by-product plant, while steam requirements are considerably increased because of high-pressure distribution of gas. Such oil as is used in our carburetted water gas plant is principally the product which is derived from the benzole plant in the extraction of naphthalene from the gas. On a few occasions we have used fresh gas oil for the purpose of augmenting our supply to the C.W.G. plant to meet emergencies. Another feature of these results is that the increased coal is carbonized in the same number of retorts as were in use in 1907, and while we have far exceeded the supposed original capacity of our works, we still have in reserve five-twelfths of the total carbonizing capacity of our retort bench. The flexibility of our plant is considerable, and makes the operations in manufacture a matter very much of choice.

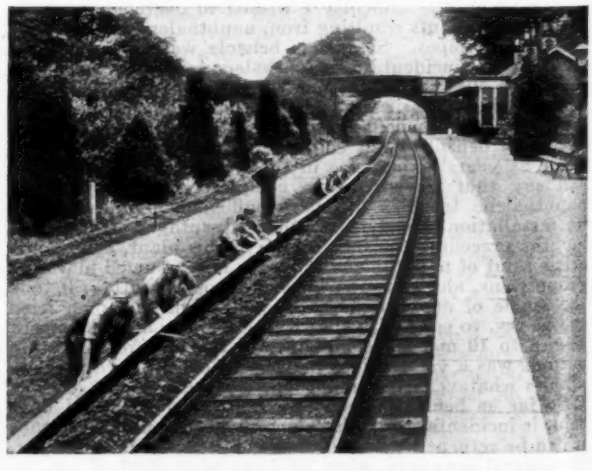
Distribution and Sales.

The importance of this section of our work can scarcely be over-estimated. We may manufacture the best and cheapest gas, but if we cannot dispose of it in reasonable measure to our customers we fail in our purpose to serve the public. With the development in our gas sales we have had many problems to contend with in maintaining adequate volume and pressure of gas in our various districts of supply. Fortunately for us, there have been outlying areas adjacent to our town which I was able to convince my Town Council were worth supplying with gas. These we supplied by means of high-pressure mains, controlled by district governors. The existence of these mains has, incidentally, made it possible to augment the pressure in our own outer areas, and at practically no capital cost to the works, since the outside areas are charged an additional rate to cover the capital costs of these extensions. We have at present two villages supplied with gas entirely from our high-pressure mains, and, in addition, have gained many odd consumers along the line of our pipe track, which additional customers we would not otherwise have obtained.

Last year we extended our high-pressure main from Milton-of-Campsie (which is situated fully three miles from our works) to the Lennox Castle Institution which has been erected by the Corporation of Glasgow. The main was laid for a distance of just over three miles, along the Blane Valley railway track, and now gives a bulk supply to that estate. The cost of this main was borne by the Corporation of Glasgow, and, in consequence, my Town Council agreed to supply gas at the ordinary flat rate ruling within the Burgh of Kirkintilloch. It was also a condition that when the pipe was laid it should automatically become the property of the Town Council of Kirkintilloch, who would henceforth be responsible for its upkeep. Before this contract was agreed upon, other alternatives of supply had been considered, but at our flat rate of 2s. 1d. per 1,000 cu.ft. it proved to be an agreeable proposition.

Since this job was completed other developments have arisen in that area, and recently my Town Council completed negotiations with the Lennoxtown Gas Light Company to buy their works. Such an eventuality I had considered when we negotiated for the supply of gas to the Lennox Castle Estate, and, in fact, provided a branch connection on the pipe line for it. Meantime, we are in communication with the Board of Trade for an Order giving authority to supply this area. When this is obtained we shall be able, within a few days, to connect up with the Company's holder and shut down their works.

So far as main-laying is concerned, nowadays we have many problems to face. The ever-increasing number of underground cables and other pipe lines present many problems, while roads are so constructed that the cost of opening, as well as reinstating, is a matter which materially affects the expense of such work. When I considered the scheme for Lennox Castle, the question of cost was an important factor, and depending largely upon this was the possibility of our success in securing the work. Naturally, I had to take the shortest possible route, and this was along the railway line. There were a few obstacles to overcome, but making use of steel pipes our difficulties were easily surmounted. The pipes were coated and wrapped in the usual fashion, and were supplied in lengths of approximately 40 ft. The joints were acetylene welded, and were made while the pipes were supported above ground. These were tested and carefully wrapped and painted before being lowered into their track. For the purpose of testing we used a portable air compressor. The welding was so effectively carried out, however, that I think only on one occasion was there any trace of a leaking joint. The



Laying a Gas Main alongside the Railway Line.

laying of this main was carried out expeditiously. I engaged a large staff of men, and arranged the work so that sufficient joints were made each day to keep one welder fully employed. The result of this was that the whole job, for the distance of just over three miles, was completed in six weeks and three days. This job was particularly suited for the use of steel pipes.

Sales and Gas Rates.

I think we are all agreed on the necessity of bringing before the public the services which our gas can render to them. To do this advertising is a very helpful factor. Service in the form of free maintenance is nowadays almost universal, and produces its quota in maintaining the goodwill of our customers and, incidentally, affords a further opportunity for personal advertising. It is worthy of note, however, that where gas seems to serve the public to the greatest degree is in towns where it is fairly cheap, so that the surest way of increasing our business is to see that the commodity we offer is sold at the right price. Among the rank and file of our customers incomes are fairly limited, and have to meet the needs of the home in many directions. Consequently, there is a limit to what can be spent on gas, as on other requirements. If, therefore, gas is dear, the amount consumed will be proportionately less. It is commonly expressed to me by our own customers that no matter how cheaply we supply gas, bills never get any less. This proves that a low figure encourages increased consumption of gas. Certainly, I know that when a gas bill exceeds normal dimensions we hear from the customer concerned that the amount is more than he or she can afford. Realizing the limitations of our consumers, we, therefore, do not advertise for the mere sake of trying to force our commodity upon the public. We endeavour to offer the service which will do similar work at less cost than other alternatives, while at the same time giving an added convenience in saving of labour and ease of control.

The undernoted rates are charged when the consumption per annum is for quantities:

Cu Ft.					Price per Therm.		Price per 1,000 Cu.Ft.
					d.		s. d.
	Up to	100,000	..		5·55	..	2 1
Over	100,000 and	,,	200,000	..	5·33	..	2 0
,,	200,000	,, ,,	300,000	..	5·11	..	1 11
,,	300,000	,, ,,	500,000	..	4·88	..	1 10
,,	500,000	,, ,,	750,000	..	4·66	..	1 9
,,	750,000	,, ,,	1,000,000	..	4·44	..	1 8
,,	1,000,000	,, ,,	1,500,000	..	4·22	..	1 7
,,	1,500,000	,, ,,	2,000,000	..	4·0	..	1 6

Gas engines charged at 2d. per 1,000 cu.ft. less.

That we have kept our service before the public, so far as Kirkintilloch is concerned, is evinced from the fact that our average annual sale per consumer within the Burgh is just over 40,000 cu.ft. This fact has a decided bearing upon the selling price of our gas, because it means that less capital is employed in providing consumers with mains, service connections, meters, and cookers, which are a direct capital charge to the undertaking. In addition, less clerical work and general supervision is necessary.

Regarding gas charges, it is often contended that large works tend to cheapen costs of production, while they have also the advantage of buying more favourably compared with smaller undertakings; also, having a greater amount of capital at their disposal, they can develop sales more effectively. Experience does not confirm this theory.

As to the factors affecting the price of gas, it is generally claimed that the profits of a gas undertaking are made in the retort house. That may be quite true, but when one considers that any medium-sized works of fairly modern design can produce gas into the holder in the region of 1s. per 1,000 cu.ft. compared with possibly other more efficient works at a figure of approximately 8d. per 1,000 cu.ft., there is here only a difference of 4d., but in the selling price of the gas the difference may be very considerable. Other reasons, therefore, must contribute to the cause. To my mind, the capital account is largely responsible. Many of our members are doing good work for which they get no credit simply because the works in which they find themselves employed are carrying an overload of capital. With corporation undertakings this disadvantage is not so serious, since annual instalments towards repayment of capital is a compulsory condition to borrowing; therefore time redeems their position; but with a holding company, whose capital account never gets less, a more serious state exists.

Future Outlook.

It is my view that the future will continue to offer opportunities for increased prosperity to our Industry. This idea is supported by the fact that makers of all kinds of gas appliances are keenly exerting themselves to produce the most attractive and most efficient appliances. These improved types of appliances appearing on the market offer new avenues for increased gas sales. What, however, is an important factor in support of our future prosperity is that there are more householders to-day according to the population than formerly, which means relatively more gas consumers. A house with a family, say, of 8 to 10, as was common in earlier days, shared the light and heat of one home. Now, with families much smaller, more houses are required for the same population, which requires similar services, although the members in the house may be fewer. Incidentally, there are more wage-earners according to the population, which means more spending capacity. To an extent, progress to-day may be largely accounted for by these facts. Apart from this, I think the present tendency towards increased cost of living will inevitably result in an increase in wage earnings. This may give us a further opportunity, if we can face the position as it affects our gas business, without proportionately increasing our sale charges. Industry offers to many of us prospects of new and increased business but particularly to those in industrial centres, where land values are high and where space and convenience count for much.

The Industry to which we are attached fills a most important position in the national affairs of our country. We are part of a great commercial enterprise as well as a public service. Our ranks are strongly united through our national organizations, by whose efforts much of the prosperity and goodwill we enjoy are obtained. If this is to be continued, it is more and more essential that all undertakings give to these bodies their full financial support, so that our Industry will speak with authority and with one voice. The value of our national bodies, I think, is fully appreciated by us all, and the great service that was rendered to our Industry recently in connection with the new Coal Mines Act was a striking example of their importance and value to us.

In looking forward, we are confident that the future holds for us all ever-increasing opportunities for new spheres of service, and that we shall continue as a great national Industry, to prove the truth of the claim that "Gas is Public Servant No. 1."

Vote of Thanks.

Mr. J. Jamieson (Edinburgh), Senior Vice-President, in moving a vote of thanks to Mr. Dickson, said they had been close friends for 30 years. They had first met when searching for knowledge and experience likely to assist them in the future. In that search he could have found no better companion than their President. He was a good student and a great worker, thorough in everything he did, and he had fully displayed these characteristics in his year as President. They had listened to an Address full of commonsense and of value to them all, one that must rank as among the best ever presented to the Association. He had outlined the Kirkintilloch undertaking, its history and progress, its methods, and its service to the community in a particularly pleasing and refreshing way. He had shown a record of achievement which could not be bettered by any undertaking in the country. Unlike most of them he had not found it necessary to desert horizontal retorts, nor had he embarked on any large scheme of capital expenditure. The results and figures put before them that morning seemed to justify the course pursued. At the present time, said Mr. Jamieson, they were faced with an increase in coal prices, the limit of which they did not know, and water gas, therefore, must assume an importance greater than in the immediate past. He had been impressed with the flexibility Mr. Dickson had succeeded in arranging in his plant. The success of the Kirkintilloch undertaking was due to Mr. Dickson's prudent management. They had established prohibition in the town, where the citizens were denied a ration of the spirit of malt and barley but received one of the spirit of coal which could not, by any stretch of the imagination, be described as temperate! They envied Mr. Dickson's average supply to consumers of 40,000 cu.ft. annually and if this was the fruit of prohibition the sooner they applied it to other towns the better!

Mr. G. Braidwood (Coatbridge), Junior Vice-President, seconded the vote of thanks, which was duly acknowledged by the President.

The Use of Copper Pipe

BETWEEN MAIN AND CONSUMERS' PREMISES

by
J. BARKER,
Engineer and Manager of the Nairn Gas Light Company.

A Paper presented at the Annual Meeting of the North British Association of Gas Managers, held at Kirkintilloch on Sept. 10.

Some fifteen years ago we observed the behaviour of light grade copper tube laid underground as a service between the water main and the consumer's premises. With the permission of the owner of the property we examined the water service pipe which had been in use for five years, and we found the material to be in faultless condition.

In the month of March, 1927, we laid copper gas service pipes to two blocks of houses. At the same time we laid service pipes composed of wrought iron to another two blocks of houses. Within ten months the wrought iron pipes showed signs of internal corrosion, while no change had occurred within the copper pipes. Since that time we have used only copper for the gas service pipes laid at Nairn.

The copper pipe has other advantages. There is no risk of leakage in the body or at the joints of the pipe. The service pipes laid vary in size from ¾ in. to 2 in. diameter. We use tubes of the best quality obtainable, made to a British Standard Specification for Light Gauge Copper Tubes. These are supplied by the Yorkshire Copper Company, of Leeds, and the Imperial Chemical Company. The fittings are manufactured by Messrs. James Lamont & Co., Ltd., of Edinburgh, the trade name of these fittings being "Securex." We have no preference whatever for the goods manufactured by any particular firm, but we have always had good service and good material at reasonable prices from the firms mentioned.

Experience has proved the advantage of having the meter and stopcock couplings made to take the "Securex" fittings. It took some time to convince the meter makers of the advantages of this system, but, with their help, we are now able to run the copper service direct from the main to the meter, and from the meter to the cooker, the wash boiler, the lighting fittings, or any type of fittings, without a solder joint. This simplifies the work and reduces the cost.

In laying the service pipes, the usual precautions are taken to consolidate the trench. In filling the trench the procedure is as follows: We select fine soil and bottom the trench with this material to a depth of 3 in. On the top of this bed we lay the service pipe, covering it with about 3 in. of fine soil which is free from stones. We then lay a 4 in. by 1 in. board along the length of the trench above the pipe. This is done to distribute the pressure equally over the length of the trench and protect the pipe when other road users make openings. This practice is followed for all sizes of service pipe.

In connecting the service pipes the operation is as follows: We drill and tap the side of the main and insert a brass connection, one end of which is screwed male iron; the other end is made to take the copper pipe. The copper pipe is carried direct into the premises and is connected to the meter, which has the bosses made specially to take the copper pipe. We get a metal to metal joint at all points. This makes a better job than the insertion of a leather washer. If the service pipe is to be connected to a steel main, a "Du-ex" nipple is expanded into the steel main. We "couple up" with a brass connection—female iron at one end and fitted for copper at the other end.

Work Inside Consumers' Premises.

For work inside consumers' premises, we use copper pipe extensively. Only copper is used for uprising pipes from the meter to the upper floors. When wrought iron pipes were used we had a great deal of trouble with fine dust dropping into the meter outlet.

Copper pipes are used on all connections to cookers and wash boilers. The copper pipe retains its shape under all conditions. There is no risk of flattening or damage of any kind through spring cleaning, redecoration, or other work within the premises.

In fitting up high-grade cookers we use chromium-plated copper pipe and connections, as we believe that it is our duty to our consumers to see that the connections we put in are in keeping with the quality and appearance of the apparatus fixed.

The following is a note of the weight of copper pipe used for the different sizes of services required:

In.	S.W.G.	Lb. per Foot.
½	19	0·26
¾	19	0·38
1	18	0·61
1¼	17	0·88
1½	17	1·05
2	16	1·60

Approximate Weight per Ten Feet.

In	Lb.	Oz.
½	2	10
¾	3	13
1	6	2
1¼	8	13
1½	10	8
2	16	0

The grade of pipe used is housing quality semi-hard. We find this is the most suitable quality to use, as it is easy to work and can be softened easily if necessary.

Another thing which might possibly be of interest and which is not always appreciated is the remarkable strength of light gauge copper tubes. The following are the bursting pressures as compared with lead pipes.

Internal Diameter. In.	Thickness.		Bursting Pressures. Lb. per Sq.In.	
	Gauge.	In.	Copper.	Lead.
½	19	0·040	6,720	..
	18	0·048	8,060	..
		0·19	..	1,930
¾	19	0·040	4,480	..
	18	0·048	5,380	..
		0·20	..	1,360
1	18	0·048	4,040	..
	17	0·056	4,700	..
		0·21	..	1,070
1¼	18	0·048	3,220	..
	17	0·056	3,765	..
		0·21	..	865
1½	18	0·048	2,690	..
	17	0·056	3,130	..
		0·3	..	1,000

Tools Required in Working Copper.

The tools required in working copper are much less expensive than those required for iron pipe and are much easier for the fitter to carry. They are as follows:

One hammer, about 1½ lb. to 2 lb. weight.
One hack saw for cutting pipe.
One drift for each size of pipe used.
One bending spring for each size of pipe used.
One file for squaring up and taking the burr off the pipe after cutting.
One spanner for each size of coupling nut used, or one set of expanding spanners, ½ in. to 2 in.
One hardwood pipe dressing tool.
One light screwdriver.

No screwing tackle is required. Pipe wrenches of the toothed pattern should not be used.

The method of connecting up the copper pipe is simple. The pipe is cut to the desired length, care being taken to see that the end is square and the burr removed. Slip a half of the connecting coupling over each end of the pipes

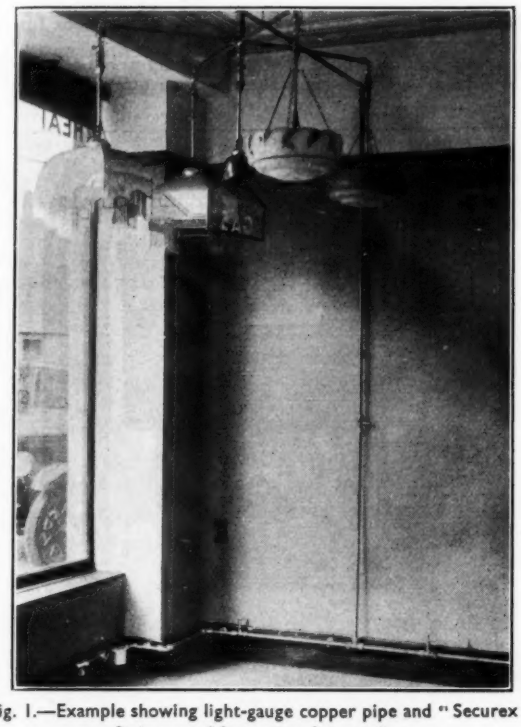


Fig. 1.—Example showing light-gauge copper pipe and "Securex" fittings used for external carcassing.

Above and all subsequent photographs with the exception of Figs. 3 and 5 are by D. A. Grant, of Nairn.

to be joined, drift out the pipes to the desired depth (marked on the drift), coat the cone lightly with graphite compound, insert the cone in one end of the prepared pipe, and bring the two half couplings together. You will then have a sound secure joint and at the same time a joint that can be taken apart and re-made at any time if alterations of the pipe become necessary.

The work is so simple that any ordinary fitter would soon become proficient.

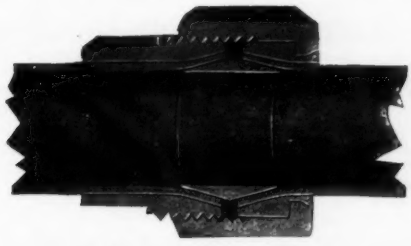


Fig. 3.—The "Securex" Joint.

The comparative costs of a service pipe in iron, lead, and copper are as follows: We take, for example, 1 in. services in iron, lead, and copper. The excavation work is not included, as it would be the same in all cases. The figures are based on actual costs to us. These, of course, will vary from place to place, according to the wages paid and the prices paid for fittings, which again will vary according to the quantities bought.

IRON.

	£	s.	d.
12 ft. 1 in. bitumen coated W.I. pipe (4½d.)	0	4	6
13 ,, 1 ,, W.I. pipe (4d.)	0	4	4
2 1 ,, slip screws (5d.)	0	0	10
1 1 ,, hexagonal nipple (1¾d.)	0	0	1¾
2 1 ,, tees and plugs (8¾d.)	0	1	5½
1 1 ,, C. & C. cock (4s. 3d.)	0	4	3
2 ft. 1 ,, lead pipe (6½d.)	0	1	1
4½ hours pipelayer at 1s. 6½d.	0	6	11¼
4½ hours labourer at 1s. 3½d.	0	5	9¾
	£1	9	4

LEAD.

	£	s.	d.
25 ft. 1 in by 8 lb. lead pipe (7d.)	0	14	7
1 1 ,, branch coupling (1s. 11d.)	0	1	11
1 1 ,, brass cock (4s. 3d.)	0	4	3
4 lb. solder (pot), 4 joints (1s. 2d.)	0	4	8
4 hours plumber at 1s. 10d.	0	7	4
½ hour pipelayer at 1s. 6½d.	0	0	9
	£1	13	6

Fig. 2.—Showing "Yorkwhite" light-gauge cupro-nickel pipe and chromium-plated "Securex" fittings used for external carcassing at the showrooms of the Nairn Gas Light Company.

COPPER.

	£	s.	d.
25 ft. 1 in. copper pipe, 0·61 lb. per ft. at 9½d. per lb.	0	12	1
1 1 ,, "Securex" male connection	0	1	9
1 1 ,, "Securex" bend	0	2	8
1 1 ,, gas stopcock complete with "Securex" nuts	0	4	4
Extra for fitting meters to take "Securex" connections	0	2	6
2 hours plumber at 1s. 10d.	0	3	8
2 hours labourer at 1s. 3½d.	0	2	7
	£1	9	7

The photographs show examples of the method we adopt and the special meters we have designed for use with copper pipe. You will note that for all new work where we have a lighting and cooking load we use a meter with a bottom inlet and a top outlet.

The meter is fixed roughly 4 ft. 6 in. from the floor level and is supported on the copper inlet and outlet pipes. No other support is necessary, and the meters are clear of the wall by at least ¾ in. If a second, third, or fourth flat is

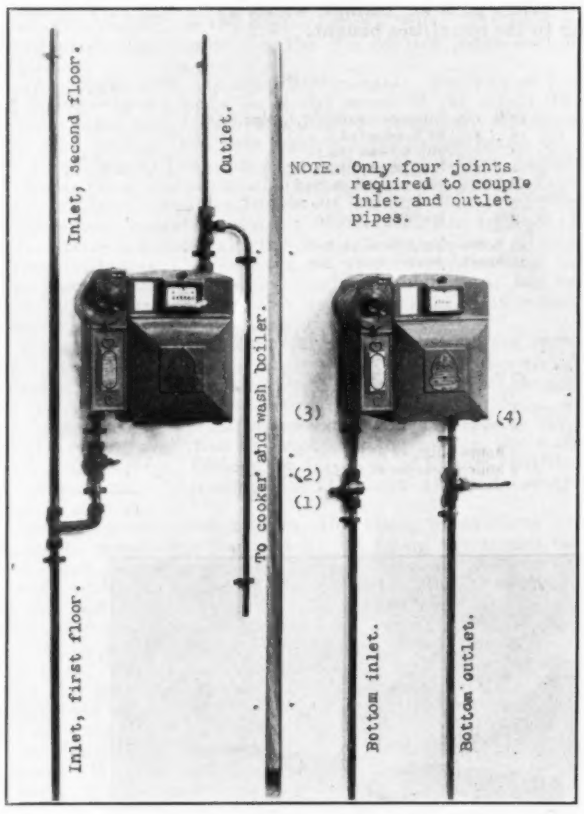


Fig. 4.—Showing *left* meter with bottom inlet and top outlet fitted to take copper pipe and "Securex" connections (fixed 4 ft. 6 in. from floor level), and *right* meter with bottom inlet and outlet fitted to take "Securex" connections and copper pipe (fixed 4 ft. 6 in. from floor level)

to be connected, a special tee piece is used, which is so arranged that floor after floor can be fitted from the same service pipe.

When fitting houses where only a cooking and water heating load is to be catered for, a meter with inlet and outlet on the bottom is used. This service can be extended from flat to flat as in the first case. In meters where it is desired to retain the inlet and outlet in the standard position a copper or brass tail can be left for the connection of the lead or "compo" pipe.

Meter stopcocks are made as samples with two ends coned out to take "Securex" connections. The small stopcocks in use for boiler and water heater connections are treated in the same manner.

The sample of a ¾ in. service pipe in copper was laid by us and has been in constant use since March, 1927. You will note that the pipe is in quite as good condition as when it was laid.

Benefits from Use of Copper Services.

The benefits from use of copper pipe as services for gas are given below:

Freedom from trouble due to stoppages caused by internal corrosion of iron and steel service pipes.

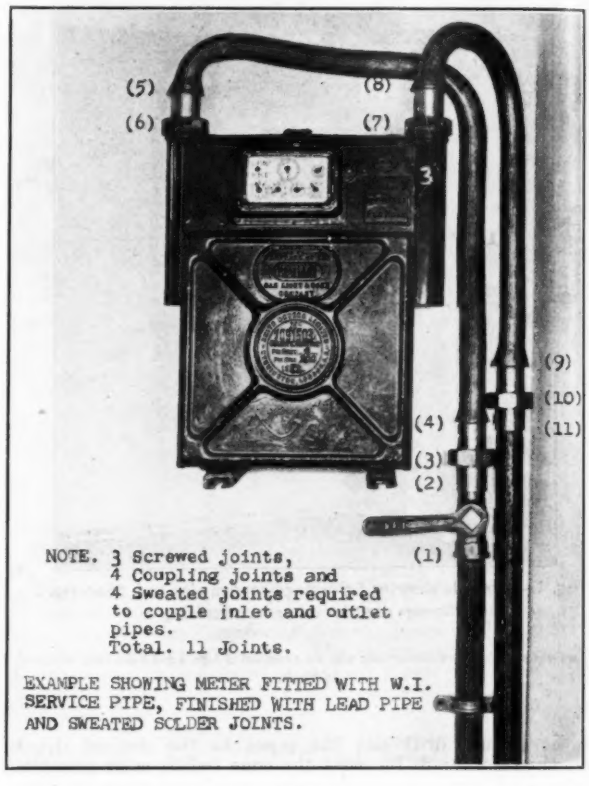


Fig. 5.

Longer life, as many steel and iron services have to be re-laid in a shorter period than eight years owing to internal and external corrosion.

The loss of pressure due to a frictional resistance to flow

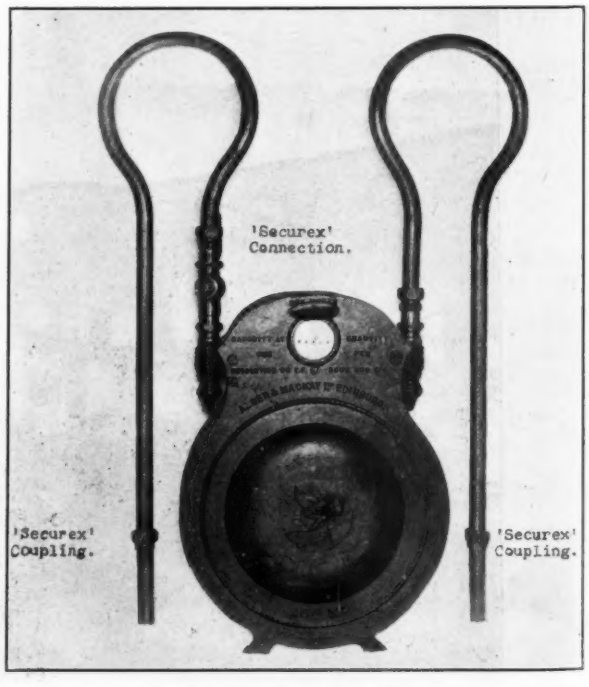


Fig. 6.—Example showing use of copper pipe in fixing meters at Nairn [2 in. copper pipe 16 s.w.g.].

is much less with a copper installation than with an iron or steel installation, due to the fact that copper tubes have, and maintain, a much smoother inside surface, in conjunction with the fact that copper tubes can be bent and the use of elbows and bends is avoided, thus maintaining a smooth streamline flow through the pipe line.

Meters last longer as they are free from dust.

Costs are less if a long view is taken, as once a copper service is laid one has no further trouble and less breaking up of streets is necessary. Copper is always saleable if it is found necessary to remove a service from the street, while one has usually to pay for the removal of scrap iron or steel pipes.

If you have any doubt about the copper pipe being able to stand up to high-pressure work, we would just say that

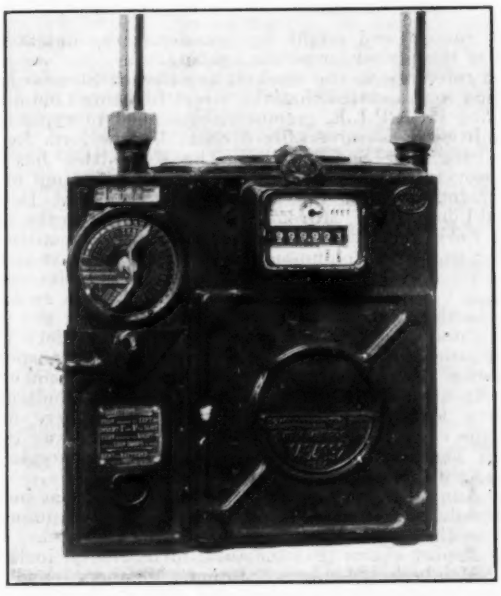


Fig. 7.—Prepayment meter fitted with special "Securex" connections to take copper pipe.

we are using this same class of pipe for steam connections on our boilers, which run up to a pressure of 80 lb. per sq.in., and we have had no trouble.

If the foregoing has been of interest to you, and if there is any point not quite clear, I would endeavour to answer any enquiry you may make.

Discussion.

Mr. D. Fulton (Helensburgh) said he had visited Nairn and had come under the spell of Mr. Barker's terrific faith in copper. It was refreshing to find such faith, and Mr. Barker's gospel was bound to make converts. The illustrations were so admirable that he thought of the injunction at school examinations, "Simple sketches should be used wherever possible to avoid long explanations." The development of the cone fitting had brought copper tubes into a sphere of use which was impossible in earlier days and the cost had been reduced so enormously as to bring copper into competition with iron and lead. Many of them suspected that, while the cone joints might keep in water, they might not be gas-tight, but Mr. Barker had assured them they were absolutely gas-tight. Corrosion in iron pipes was something that troubled them all for it took very few particles to close up the nipples of a burner. He was a little suspicious of the costs question as between wrought iron and light copper.

Mr. R. D. Keillor (Greenock) said that not only their Association but the whole world would benefit from this pioneer work in copper piping. Due to lack of foresight, they found that the size of the service put into houses was proving inadequate and he was glad to hear Mr. Barker saying that adequate pipes should be used. It was surprising that none of their senior Associations had brought this matter forward. Perhaps there was some hidden snag, due to galvanic action and the coupling of dissimilar metals, but the question was one which should receive scientific investigation.

Colonel W. Carmichael Peebles (Edinburgh) said the new meter connections were expensive and, although they were all trying to produce cheaper than ever, they had already all kinds of meters in use and here was yet another to add to the number. It would, of course, cost more for every little alteration meant more in the way of cost to the manufacturers.

Dried Gas and Internal Corrosion.

Mr. S. Lacey said that the Paper was of great value to all undertakings considering the use of wrought iron, steel, or copper. His own Company had sent a representative to Nairn to see what was being done at first-hand. Mr. Barker said that one benefit was freedom from trouble due to stoppages through internal corrosion, but this would not apply to those who dried their gas. He said also that the copper pipes gave eight years' service and had a longer life than most steel and iron services. He compared copper with bitumen coated iron, but if iron service were properly coated its life was practically the same as that of copper. His own Company used steel, as they found in practice that there was no material difference in life between it and wrought iron. There was no good reason for any change-over to copper on life grounds, unless it might be justified financially. Mr. Barker reckoned the cost was much the same. In London they had made a test on three flats, one being steel carcassed and the other two carcassed with copper. Figures were (1) mild steel, fitter, and mate, £1 14s. 1d.; (2) copper, £2 11s. 1d.; (3) copper, fitter work only, £2 6s. 10d. Unless the price of copper pipes fell substantially, copper installation would mean increased cost. Mr. Barker said there was a third benefit in reduced loss of pressure due to frictional resistance to flow, but the whole question was wrapped up in the matter of cost. It was true to say that copper pipes cost us more than twice as much as steel pipes of the same capacity. For their purposes he did not think that copper would replace steel. There was something to be said for it from the point of view of appearance and a good case could be made out for its use for surface work. Copper made a better-looking job, and it lent itself to chromium plating or to the colour of an appliance to which it might be fitted. The Gas Light and Coke Company was making an increasing use of copper for surface work.

Mr. J. Wilson (Dundee) said it was better to have something done than to listen to all the theorizing in the world. If they had not the same faith in copper as Mr. Barker, the fault might be in them and not in the copper. An ordinary workman could make a neat and tidy job with copper. In their new showrooms in Dundee all their pipes were of copper. They had used a joint made by a local firm which they found very effective. They had dropped the use of a hacksaw and employed a pipe-cutter which made a beautiful job, always dead square. He would like to know how Mr. Barker found the pipes in frost. Copper was so much stronger that it might stand frost much better than lead or soft metal pipes.

The Author's Reply.

Mr. Barker, replying to the discussion, said that pipes should be put in to last ten years. He could assure Mr. Lacey that his figures regarding costs had been carefully checked and were correct. It might be that this meter was something new and not standard, but if anything could be discovered of benefit to the Industry it should be used. The height of the meter from the floor—viz., 4 ft. 6 in., suited most of the people.

Mr. John Barker, Reader of the foregoing Paper, with the New Vice-President, Mr. H. A. Aitken.

Association of Public Lighting Engineers

Annual Conference at Cheltenham Spa.

Members of the Association of Public Lighting Engineers and their ladies spent an enjoyable and instructive few days at Cheltenham Spa from Sept. 7 to 10, the occasion of the Association's Annual Conference.

Thanks to the efforts of local interests, including the Mayor and Corporation, the Cheltenham and District Gas Company, and the Borough Electricity Department, who provided hospitality and facilities for the Conference, and for street lighting and floodlighting demonstrations, as well as an exhibition of public lighting equipment, the programme which was able to be arranged for its members was excellent.

In addition to the programme of meetings, a reception and dance at the Town Hall, a conversazione, the Association's banquet, and a charabanc tour of Cotswold villages, a special programme was arranged for the ladies during the period of the meetings.

The attractions of Cheltenham were greatly enhanced by the demonstrations of lighting that were arranged during the conference week. There were demonstrations of both gas and electric lighting. Messrs. James Keith & Blackman Company, Ltd., provided lighting at the Winter Garden Band Stand with "Supervia" high-pressure lamps; Messrs. Gowshall, Ltd., provided a "Minor" gas-illuminated traffic guard post, fitted with Horstmann clock controller and two bijou burners consuming 4 cu.ft. per hour; Messrs. Foster & Pullen, Ltd., displayed some "Avil" suspension lamps on steel columns on the East side of the Winter Garden; Messrs. C. H. Kempton & Co., Ltd., displayed three suspension and two square type lanterns, also on the East side of the Winter Garden; Messrs. W. Parkinson & Co. demonstrated some 12-light "Maxill" lamps at 100-ft. spacings and suspended from 25-ft. "Adastra" sectional steel columns, at the South end of the Winter Garden, and a further installation at London Road, Charlton Kings; and Messrs. W. Sugg & Co., Ltd., arranged an installation of 12-light No. 2 size "B/2" "London" lamps on steel columns at Imperial Square, as well as some 6-light suspension and upright "Rochester" lamps on the carriage way into the Winter Gardens.

Gas also played a prominent part in the floodlighting of buildings and gardens. St. George's Square Putting Green, Holy Trinity Church, and New Court Hotel were floodlighted by Messrs. W. Parkinson & Co.; the High Street entrance of Sandford Park by Messrs. C. H. Kempton & Co., Ltd.; the Lansdown Hotel and the Bath Road entrance to Sandford Park by Messrs. Foster & Pullen, Ltd.; and Pyatts Hotel and St. Gregory's Church by Messrs. W. Sugg & Co., Ltd.

Annual General Meeting.

The Annual General Meeting was held on Monday afternoon, Sept. 7, in the Pillar Room at the Town Hall, Cheltenham. Mr. A. MAURICE BELL (the retiring President) presided during the early part of the proceedings, and extended a hearty welcome to all members and delegates attending, especially those from overseas—as near as Ireland and as far away as Malta.

Mr. W. J. STEWART (Hon. Editor) presented the Annual Report for the year 1935-36. This calls attention to the fact that Mr. J. Stewart Dow, who has given valuable service to the Association as Hon. Secretary and as Editor of the *Illuminating Engineer*, which has formed the official journal of the Association, has resigned at the end of 1935 to concentrate his energies upon his other work. Mr. H. O. Davies has been appointed Secretary of the Association and has also undertaken the production of a new Journal, *Public Lighting and Public Lighting Engineer*, the official organ of the Association. It is being published quarterly.

Attention was drawn to the interim report (issued in September, 1935) of the Ministry of Transport Departmental Committee on Street Lighting, which Committee included Mr. J. F. Colquhoun (a Past-President of the A.P.L.E.) and Mr. C. C. Paterson (Hon. Member). The interim report made recommendations for the lighting of traffic routes, and might be considered the outstanding event of the period for public lighting.

In a reference to the work of the British Standards Institution it was stated that the Street Lighting Committee, including its A.P.L.E. members, continued to explore the possibilities of a universally acceptable new form for the Street Lighting Specification. The Committee has also been working on the application to a Specification of the recommendations of the Ministry of Transport Departmental Committee. Movement has been made in the secretarial work allotted to the Street Lighting Committee by the International Commission on Illumination last year.

Mr. W. J. Liberty, the A.P.L.E. representative in the National "Safety First" Association, has taken an active share in the work of that body, particularly in the work of its Public Safety Committee. The Road Safety Committee proposed to pass to the Minister of Transport a suggestion from the North Riding to use white cement for kerbs on all new roads. In the report of the Cheltenham "Safety First" Council it is stated that where many accidents occur "steps are taken to create one-way traffic (which has been found totally to eliminate accidents), traffic lights, better road lights."

The Annual Report of the A.P.L.E. contains, as in past years, data and reports on public lighting from numerous towns in the country and from some towns abroad.

The Report shows that the total membership, including Hon. Members, Members, Junior Members, and Associates, numbers 321, as compared with 276 in 1934.

Mr. H. C. BROWN (Hon. Treasurer) submitted the financial statement for the year ended Dec. 31, 1935. He stated that revenue continued to increase, as did expenditure, and the Association had been able to increase its bank balance by, roughly, £100.

The Annual Report and Accounts were adopted.

Proposed Education Scheme.

Mr. H. DAVIES (Chesterfield) recalled that in his Presidential Address some years ago he had suggested the desirability of an educational scheme for public lighting engineers. The Association had made provision for it in the 1928 by-laws, and a Committee had been appointed by the Council to deal with the matter. The Committee had had interviews with educational authorities and specialists, and had had the advice of Dr. Burness, of the Board of Education. With the assistance of Dr. Burness, the Committee had drawn up a syllabus and a scheme which in the opinion of the Council should prove satisfactory at this juncture. The syllabus was fairly comprehensive, and the scheme provided for three stages, one for candidates under 18 years of age, another for candidates at 19 years (or younger if they have the necessary qualification), and one which does not specify any age limit but imposes the necessity of five years' experience in a responsible position in a public lighting department. After the final examination a Diploma will be awarded by the Association. He hoped the public lighting authorities would look favourably upon any education scheme which the Association put forward and would endeavour to give every assistance to those studying for the profession. The proposed scheme would be operated in collaboration with the City and Guilds of London Institute and the Board of Education.

Mr. DAVIES emphasized the fact that the scheme proposed was of a preliminary nature, and he hoped that in the course of time it would be developed further. The proposal was that the scheme should be carried through by examination, through the City and Guilds of London Institute. The profession wished to give every facility for students to undergo proper training in technical colleges and to submit themselves to examination after a reasonable period, and eventually to gain the Association's Diploma. Probably there would not be a large number of students from the smaller centres who could take special courses on scientific matters appertaining to public lighting, but facilities might well be given in London, Man-

chester, Sheffield, Leeds, Newcastle, Glasgow, Edinburgh, and probably Aberdeen. The technical colleges were only too willing to work in conjunction with any scheme set up by the Association.

Mr. Davies proposed that the Council be empowered to appoint a Committee to put the scheme into operation forthwith, with power to co-opt members who were able to assist.

Mr. T. WILKIE (Leicester), seconding, said there was never a more opportune moment than the present in the history of either the Association or of public lighting for the launching of such a scheme; with the sudden abnormal growth of the Association, something should be done to give it its proper status.

Mr. W. E. GREENHALGH (Bury) urged that there should be facilities for brilliant students in outlying districts to pursue their studies in their own homes.

Mr. DAVIES said that the possibility of enabling students in outlying districts to study was one reason why the Board of Education had suggested that the Association should work through the City and Guilds of London Institute. The scheme did not imply that any specific technical college course must be taken, but it implied that a certain standard of education must be attained before a man could enter. He believed that when the scheme was put into operation, one or two of the correspondence colleges would be quite willing to provide facilities for training in the course. It was the intention that the scheme should not be limited to students who were able to attend universities or technical colleges.

Mr. J. H. CLEGG (Southport) supported the scheme as highly desirable and necessary. Referring to the requirement, however, that candidates for the final examination must, in addition to possessing a sound knowledge of the subjects covered by the syllabus, also have gained some distinction in the subject of public lighting or must have been engaged in a *responsible* position dealing with public lighting for not less than five years, he suggested that the word "approved" be substituted for "responsible." He pointed out that the number of separate municipal public lighting departments in the country was relatively few, and he doubted that many of the assistants in those departments who had time for the necessary studies could be regarded as having occupied "responsible" positions. Most employers would expect a man to hold the Diploma before appointing him to a responsible position. Therefore, the use of the word "responsible" might nullify the object of the examination scheme. Also, eligible candidates who were assistants in gas undertakings might not be regarded as occupying "responsible" positions in public lighting.

Mr. DAVIES replied that if a man were a gas or electrical engineer and was studying public lighting he was in a responsible position dealing with public lighting. The Council could be trusted to ensure that the scheme was not limited to men from municipal public lighting departments, because in that case there would be only 10 or 12 candidates each year. Lighting engineers were needed, whether they came from the gas or electricity industries, or from the manufacturing side. The status of public lighting engineers would be greatly enhanced by the adoption of the scheme.

A ballot was held for the election of three members of Council. Mr. T. Wilkie (Leicester) and Mr. H. Davies (Chesterfield) were re-elected, and Mr. W. N. C. Clinch (Brighton) was elected.

Mr. E. C. LENNOX, M.I.E.E. (Newcastle-upon-Tyne), was then invested with the Presidential Chain of Office, and formally occupied the Chair.

CIVIC WELCOME AND OPENING OF CONFERENCE.

The members and delegates and their ladies assembled on Tuesday, Sept. 8, in the Town Hall, and before the opening of the Conference they listened to an organ recital by Mr. John Gilbert.

His Worship the Mayor of Cheltenham (Councillor D. L. Lipson, M.A.), who was accompanied by many members of the Town Council, wearing their robes, extended to all the visitors a hearty welcome to Cheltenham and expressed appreciation of the fact that the Association had decided to meet in the town.

Sir Charles Bressey, C.B. (Engineer, Highway Development Survey (Greater London), Ministry of Transport), officially opened the Conference of the Association, to which he referred as a neutral stadium for those keen and skilful competitors—electricity and gas—from whose ardent rivalry the public had derived so much benefit. It was all to the good, he said, that the champions of the two competing illuminants should meet together for a friendly and sociable discussion upon street lighting problems in their fundamental aspects. To the Association, continued Sir Charles, the Minister owed a debt of gratitude for assistance rendered to the Departmental Committee on Street Lighting. Judging by the Interim Report already issued, one might well hope that the deliberations of the Committee would inspire a conspicuous advance in street lighting practice throughout the country. General concurrence would be expressed with the Committee's recommendation that on traffic routes the minimum standard of lighting should be that which enabled drivers to proceed with safety at 30 m.p.h. without the use of headlights. That was a minimum standard; the ideal was such a standard of visibility as would ensure that the risk of accidents was no greater between dusk and dawn than during the hours of daylight. The Ministry of Transport's recently published analysis of the fatal road accidents in 1935 showed the perils associated with the hours of dusk and darkness, the most dangerous periods of the 24 hours being those from 5 to 6 p.m. and from 10 to 11 p.m., despite the fact that during the latter hour the traffic flow was usually not conspicuously heavy. As regards modern gas lighting, the Greenford Road, in Middlesex, furnished a notable illustration.

On the motion of Mr. A. Maurice Bell, the immediate Past-President, a hearty vote of thanks was accorded the Mayor of Cheltenham and Sir Charles Bressey for their addresses.

Message from the Minister of Transport.

A message was received from the Rt. Hon. Leslie Hore-Belisha (Minister of Transport), conveying the Minister's greetings and good wishes to all present. In it he stated that he would follow the deliberations of the Association's annual conference closely.

Presentation to the Retiring President.

The President presented to Mr. A. Maurice Bell, the immediate Past-President, a framed copy of the Presidential Certificate and a small replica of the Presidential badge of office, as a memento of his successful work on behalf of the Association.

Luncheon by the Cheltenham Gas Company.

A large number of members of the Association and other guests, including the Mayor of Cheltenham and some of his colleagues on the Town Council, were entertained at luncheon in the Town Hall on Sept. 8 by the Chairman and Directors of the Cheltenham and District Gas Company. Mr. SIDNEY G. WOOD (Chairman of the Company) presided.

Mr. LESLIE BOYCE, M.P., proposed "The Association of Public Lighting Engineers." Unquestionably, he said, public lighting had become one of the most important social amenities. The ordinary man in the street did not mind whether it was effected by means of gas or electricity so long as it was done well, and the healthy rivalry existing between the two industries, coupled with a very keen sense of responsibility and public service, should give us all a brighter outlook for the future.

The PRESIDENT (Mr. E. C. Lennox) responded. In a reference to the education scheme which the Association proposed to put forward, he said it would guide junior members of the profession in their education, not in the use of either gas or electricity for street lighting, but in the use of both those lighting sources for the benefit of the public generally. It was hoped that when the scheme was in being the Association's Diploma would be the hall-mark of efficiency for the public lighting engineer; a man who secured it would be worthy of his place.

Mr. C. WINSTONE (Vice-President, A.P.L.E.) proposed "The Cheltenham and District Gas Company." He thanked the Chairman and his co-Directors for their hospitality; and presented to Mr. Wood a memento of the occasion, as a token of gratitude, and wished the Gas Company all the prosperity it deserved.

Mr. SIDNEY G. WOOD, responding, said that it afforded the Company very great pleasure to welcome so distinguished and representative an assembly to the beautiful town of Cheltenham.

The Annual Banquet and Dance.

The Association entertained many distinguished guests at its Annual Banquet, which was held at the Town Hall, Cheltenham, on Wednesday evening, Sept. 9.

Sir CHARLES BRESSEY, C.B., C.B.E., F.S.I., proposed "The Public Lighting Industry." Sir Charles is Engineer to the Highway Development Survey (Greater London) at the Ministry of Transport. One of the most vivid impressions of the Conference, he said, was of the extraordinary enterprise and initiative shown by the representatives of the public lighting industry. Indeed, one might say that the industry had been the fairy godmother of the Conference; it had produced a most amazing illustration of what could be done by the combination of technical skill and, apparently, unlimited capital! He believed the capital laid out would be thoroughly remunerative, because many had attended the Conference to discover how best to solve the lighting problem in their own areas. They would go back with the satisfactory conclusion that the problem could be solved. One of the solutions was afforded by the Gas Industry and another by the electrical industry.

Alderman A. W. WILLS, J.P., in his response, referred to the phenomenal progress which had been made in the realms of public lighting during the past 15 years, and paid a tribute to the manufacturers for the manner in which they had assisted that development.

The PRESIDENT, proposing the town of Cheltenham, said it

was a pleasure to all connected with the Association to have the pleasure of entertaining those who on other occasions had been the Association's hosts, and who had contributed so much to the success of the Conference. The Conference had been most happy and successful, due in no small measure to the wonderful hospitality offered to the Association, which had included the provision of rooms for meetings, gas and electricity and services for the lighting demonstrations in the streets, and a great deal of entertainment which all the members and delegates, and their ladies, had enjoyed.

His Worship The Mayor of Cheltenham (Councillor D. L. Lipson, M.A., J.P.) responded. After thanking the Association for its hospitality to himself and the Mayoress, he said that Cheltenham was a beautiful town by day, and the Association had done much to make it a beautiful town by night. A happy feature of the Association's Conference was that it had given practical proof of the possibilities for co-operation and goodwill as between the Electricity Committee (under the Chairmanship of Alderman Moore) and the Cheltenham and District Gas Company (under the Chairmanship of Mr. S. G. Wood). The public lighting demonstrations in Cheltenham, which had resulted from the co-operation between those two bodies, had been arranged without a single hitch. A great deal of the credit was due to Mr. Bache (Borough Electrical Engineer) and Mr. Morris (Commercial Manager of the Gas Company).

A toast to the President and Mrs. Lennox was proposed by Mr. A. Maurice Bell (Immediate Past-President), who congratulated them upon all they had done to make the Conference a wonderful success.

1937 Conference.

An invitation (conveyed by Mr. E. L. Allman) on behalf of the Mayor and Corporation of Folkestone to hold the 1937 Conference at Folkestone was accepted by the Association.

Presidential Address

OF

EDWARD C. LENNOX, M.I.E.E.

(of the North-Eastern Electric Supply Company, Ltd., Newcastle-upon-Tyne)

Presented on Tuesday, Sept. 8, at the Annual Conference of the Association of Public Lighting Engineers held at Cheltenham.

Since our last General Meeting an Interim Report has been issued by the Ministry of Transport of the findings of the Departmental Committee on Street Lighting set up in June, 1934. The work of the Committee is probably as difficult as that set to any special Committee to consider problems of national interest. To decide and express in technical terms what does constitute really good roadway lighting is a problem, the complexity of which should be adequately realized by all concerned in the provision and administration of street lighting. The solution can only be arrived at by the closest collaboration of the most divergent branches of science and a considerable practical experience. It is appreciated that some time must elapse before the final Report is available but, in the meantime, the Interim Report was most welcome, and should have obviated any need for delay on the part of lighting authorities in putting in hand much needed schemes for improvement in their public lighting services.

I do not propose to comment on the Report in detail as we are to have the opportunity during the Conference of a general discussion on its findings.

The issue of the Report has been followed by an increasing interest of the public in road lighting—questions have been asked in Parliament and replies have been elicited from the Minister of Transport which indicate his sympathy with our ideals.

Street lighting has become "news" in the eyes of the public and the Press have not hesitated to publish in detail items of interest concerning it, supplemented by favourable editorial comment. The value of these "editorials" cannot be denied, being a reflection of public opinion they influence the policy of appropriate authorities. I would suggest, therefore, that members bring to the notice of the Press details of improvement schemes they have in hand so that the general public may have knowledge of and take an opportunity of inspecting and appraising them. In this way, by giving as much publicity as possible to developments, we will find with an increased knowledge on the part of the public an appreciation of public lighting as a safeguard against accidents at night, and what we know among ourselves to be "a public need" will then become a "public demand."

Road Accident Data.

Attention is still being drawn to the number of accidents on streets and highways which occur daily. Notwithstanding the most laudable efforts of the Ministry of Transport and Safety First Committees, the figures are alarmingly high and statistics continue to show that the greatest number of accidents occur:

(*a*) In winter months—during the hours of 5 p.m. to 8 p.m.;

(*b*) in summer months—during the hours of 10 p.m. to 11 p.m.;

that is, during the hours where artificial lighting in streets is essential. No one will question the statement that during these hours the volume of traffic is considerably less than during hours of daylight. It is naturally difficult to ascertain for various times of the year the proportion of traffic during daylight hours to dark hours.

From the details of the traffic census (which is taken each year during August) I find the following data alluding to 1928 and 1935 for various classes of roadways. Day: 6 a.m. to 10 p.m. (16 hours); night: 10 p.m. to 6 a.m. (8 hours).

Type of Road.	Percentage, Day/Night Traffic.		Percentage Increase In Traffic, 1928/1935.	
	1928.	1935.	1928.	1935.
Industrial	5·5	7·5	56	100
Residential	7·5	9·0	31	58
Seaside	6·0	7·4	42	75
Tourist	6·5	8·5	92	150
Average (all classes)	6·3	8·8	49	107

These figures indicate:

(1) The small amount of night traffic as compared with that during the day. We can assume from these figures that the proportion of night to day traffic throughout the year does not exceed 33%.

(2) The large increase in night traffic during the past seven years.

This increase in night use of roadways will bring increased accident risks.

I find that the traffic figures on a main highway during August were:

Period.	Average Number of Vehicles per Day.		Night/ Day Traffic.	Increase in Day Traffic.	Increase in Night Traffic.
	Day.	Night			
			%	%	%
August, 1930	4 505	261	5·7	..	..
August, 1935	5,982	473	7·9	33	81

—*i.e.*, similar figures to those above quoted.

Accident data for a full year on a two-mile stretch of this roadway are given below:

(A) Before improved lighting installed.
(B) After improved lighting installed.

	During Daytime.			During Dark Hours.		
	Accidents	Killed.	Injured.	Accidents.	Killed.	Injured.
(A)	63	1	33	33	3	20
(B)	49	*Nil*	26	21	*Nil*	11
Decrease	22%	..	20%	39%	..	45%

It is rightly claimed that the greater reduction in number and severity of accidents at night, despite 81% in-

crease in traffic, is due to the better visibility afforded by improved road lighting.

It is such figures as these which establish in the minds of the public and also of lighting authorities the necessity for better public lighting. Road accidents at night must have a definite relationship to (*a*) traffic density, and (*b*) visibility, and the above-mentioned example is only one of many which I am certain could be produced showing that where better visibility has been afforded—by the provision of more adequate public lighting—the accident rate during dark hours has been materially reduced.

It does not seem unreasonable to suggest that the site of all accidents occurring during dark hours should be inspected by a capable person who would report to the police his opinion of the general visibility afforded the parties concerned. The difficulty of viewing a position after an accident under possibly different weather and traffic conditions is at once apparent, but allowance for this could no doubt be made.

A special report sheet setting out a series of questions could be prepared and the police could have this completed by a public lighting official in the area. In such a way direct evidence by competent persons would be brought to the notice of lighting authorities, and could not help but be of value to them in their deliberations.

Complete statistics of the kind necessary to show the necessity for better public lighting are very difficult and costly to obtain. After studying such figures as were available, based on 1933 Survey of Accidents, the author arrived at the following conclusions in a Paper read before the Public Works Congress in November, 1935.*

The 1935 Survey of Accidents confirm these conclusions; the 1935 figures are shown in brackets.

(1) Over 46% (1935—51%) of the total accidents occur during winter months—although traffic as expressed in vehicle-miles—*i.e.*, No. of vehicles times the miles run—is probably one-half that of summer.

As the ratio of accidents winter to summer is approximately 1 : 1,

So the accident rate winter to summer is approximately 2 : 1 per vehicle mile.

This, I believe, is due mainly to increased dark hours during winter months.

(2) Of the accidents which occur during winter months 52% occur during dark hours.

Statistics of the traffic in vehicle-miles during dark hours, as compared to daylight hours, is a matter for conjecture—but it is reasonable to suppose that the total vehicles on the roads during dark hours is only one-third of that during daytime, moreover the average miles per vehicle during dark hours is probably half that during daylight, so it is estimated that the figure for vehicle miles during dark hours is at most one-sixth of that during daylight hours:

As the proportion of accidents dark hours to daylight hours is greater than 1 : 1,

So the accident risk dark to daylight hours must be said to be greater than 6 : 1.

The Report on Fatal Road Accidents (year 1935), published by Ministry of Transport, August, 1936, shows an increase over year 1933 in accidents occurring during dark hours. The following table shows the percentage of accidents dark hours/total for various months of the year for 1933 and 1935. The figures are sufficient to show:

(1) The increasing accident risk at night, and
(2) The need for better street lighting.

Months.	Percentage Fatal Accidents. Night/Total.			
	Built-up Areas.		Non-Built-up Areas.	
	1933.	1935.	1933.	1935.
Winter months—				
January	58	66	62	62
February	51	54	46	52
March	30	39	32	43
October	41	40	47	43
November	60	67	67	67
December	67	73	66	64
Total	51	58	54	56
Summer months—				
April	20	25	31	27
May	14	16	20	22
June	12	10	17	21
July	12	13	20	16
August	16	22	22	28
September	20	26	32	38
Total	17	18·7	24	27
Total for year	33·3	40	39	40

Other countries appear to be more definite in their statements of accident data in relation to dark and daylight hours.

From America we learn that in Cleveland, on a certain highway, despite the fact that traffic density at night is less than half that of day, there were twice as many fatalities by night as by day. The ratio of accident risk night to day is therefore 4 : 1.

On certain other main traffic routes the ratio of night to day accidents per vehicle mile is:

(*a*) Fatal accidents—ten to one.
(*b*) Other accidents (injuries)—six to one.

The cost of lighting these main traffic routes has been estimated to be one-third of the present economic loss from preventable night accidents.

At Detroit it was found that the ratio of night to day accidents increased from approximately 1 to 1 to 2 to 1 when lighting was curtailed by 35%. (This curtailment of 35% of normal lighting probably saved only 10 to 15% of the annual costs.)

Further, it is stated that "there are approximately 50,000 miles of highway in the United States on which the night accident rate is at least six times that of the day accident rate, and on which corresponding savings can be made by the installation of safety lighting."

The total cost to Great Britain of roadway accidents is difficult to estimate, but, apart from loss of time and business and the enormous suffering involved, the cost to Insurance Companies for Motor Vehicle Insurance is estimated at £25,000,000 per annum.

The present annual cost of public lighting in Great Britain is approximately £5,000,000; if this were increased by 50%—*i.e.*, by a 10% saving effected on Motor Insurance Costs, the lighting could be increased by at least 100%.

By these and other considerations one is forced to the conclusion that if better visibility were provided during dark hours on heavy traffic routes and in built-up areas, the accident rate would decrease materially. One feels justified in believing that the economic gain due to decrease in accidents would more than meet the extra expenditure necessary to provide adequate public lighting.

B.S.I. Specification.

It is hoped that one of the benefits of the Departmental Committee on Street Lighting will be a new Specification on Street Lighting which will make reference to the all-important factors, including:

(1) Visibility, although at the moment it appears impossible to express this quantitatively, and
(2) Roadway brightness as a factor of visibility by contrasts.

Further, the time is long overdue when we in the lighting industry must cease talking so loosely about candle power. This figure should be accompanied by descriptive data, such as:

Mean spherical candle power, which is the average of candle power emitted in all directions of the sphere.

Mean lower hemispherical candle power, which is the average of the candle power emitted in all directions in the lower hemisphere.

Candle power in a given direction. The direction should be stated and generally in a polar or in an isocandle diagram.

Unless this is done the term candle power is confusing, and is incapable of comparison with competing light sources.

The value of lighting sources should be described in lumens, which is the basic quantity, and to avoid use of numbers with a lot of digits, terms such as kilo-lumens (1,000 lumens) could be introduced. In this way the layman, who is the purchaser, could be assured that the articles he has to choose between are based on similar levels and, with suitable diagrams indicating the efficiency of the lighting fitting or lantern, he would be able to make a proper choice.

Notwithstanding my desire to obtain similar levels for comparison of various types of equipment to simplify consideration by the purchaser, I feel that the best benefit from equipment available can only be obtained by lighting authorities appointing capable public lighting engineers who are able to put into practice their knowledge and experience for the joint benefit of the authority, the ratepayer, and the road users.

At the present time the majority of street lighting is in

* "Public Lighting: Its Necessity and Administration." E. C. Lennox, A.M.I.E.E. Public Works, Roads, and Transport Congress (1935).

the hands of the Surveyors, &c., of local authorities. These men, as a result of general improvement in public services, are having an increased amount of work to shoulder and should not be expected to be experts in all branches of engineering. The engineers of public utility undertakings, gas and electric, are therefore expected to provide the technical data for consideration, with the result that there is often misunderstanding. Larger towns have realized the benefit of appointing expert lighting engineers to control their public lighting, and I am absolutely certain that, if their example were followed extensively, it would be to the advantage of public lighting and the public purse.

Exhibition of Public Lighting Equipment

In addition to the exterior displays of public lamps and floodlighting, in connection with the Conference, in various streets in Cheltenham, a comprehensive exhibition of lighting equipment was staged in the Winter Garden, in which gas apparatus played a prominent part.

Alderman JAMES MOORE (Chairman of the Lighting Committee, Cheltenham) formally opened the Exhibition. He referred to the great progress that had been made in regard to public lighting in recent years by the public authorities, with the assistance of the electricity and gas industries, and said that the wholesome rivalry between the two industries had helped the forward movement of the lighting authorities.

Mr. E. STROUD (Chief Engineer, Holophane, Ltd.), on behalf of the manufacturers of lighting apparatus, referred to the increasing importance of public lighting, as indicated by the interest now being taken by the Government and by the majority of public bodies.

On behalf of the exhibitors, he thanked Alderman Moore for the facilities given by the Cheltenham Corporation to enable the exhibition to be held; he also expressed thanks for the great help of Mr. Bache (Borough Electrical Engineer) and his Assistant, and Mr. Morris (General Manager) and Mr. Holtam, of the Cheltenham and District Gas Company.

The Gas Exhibits.

All the leading manufacturers of gas and electrical street lighting fittings and apparatus were represented at this Exhibition. Each firm went to considerable trouble and expense to provide public lighting engineers with an opportunity of seeing every new type of fitting, suitable to meet the modern needs for greater efficiency in street lighting. In the grounds and roads surrounding the building an interesting range of various modern forms of public lighting were also to be seen under ideal and practical working conditions.

British, Foreign, and Colonial Automatic Light Controlling Company, Ltd.,

Bournemouth.

This Company exhibited a full range of their well-known "Gunfire" gas controllers—from 15 to 40 day run—suitable for all types of lanterns for street lighting, flood lighting, central heating boilers, &c.

The switches are supplied either hand wound—15 to 40 day run—or self-starting synchronous type, with or without astronomical dials.

British Gas Federation.

The stand representing the B.G.F. was arranged as an information bureau, with literature available for all those interested in gas lighting. There was also a representative display of photographs of gas lighting installations, while experts were in attendance to answer enquiries.

British Thomson-Houston Company, Ltd.,

Crown House, Aldwych, W.C. 2.

The British Thomson-Houston Company staged a comprehensive exhibit of lighting equipment of interest to all those who are concerned with the improvement of public lighting.

Calor Gas (Distributing) Company, Ltd.

17-18, Margaret Street, W. 1.

Calor gas was represented at the Exhibition by their new type of street lamp (with the container concealed in the enlarged base) on the stand of C. H. Kempton & Co., Ltd., and by street bollards on the stand of Gowshall, Ltd. The firm's Technical Director, Mr. Pickering, demonstrated the use of Calor gas for floodlighting in different parts of Cheltenham.

Foster & Pullen, Ltd.,

Avil Works, Crossley Hall, Bradford.

A convincing array of equipment for public lighting by gas supported the firm's excellent display outside the main entrance to the Exhibition Hall.

The "Alpha" lamp exhibited was of rectangular suspension type, shown in 12-light and 6-light sizes. The 6- or 12-light alignment burner requires only one by-pass, and none of the mirrors obscures or obstructs the mantles, the usual effect always being a solid rectangle of light without glare. The mantles are accessible without removal of any internal parts. The ventiiation is completely effective but concealed. In all models constant pressure governors and safety chains are fitted as standard. The "Alpha" is a shadowless lamp of pleasing design, with modest consumption.

The five sizes of the "Arcturus" lamp were interesting, embodying the results of many months of research on burner design. Their easy accessibility and simple and effective construction enhance their popularity; their heavy spun copper bodies, of registered design, weatherproof and ensuring windproof ventilation, are on handsome lines. They have superheater burner heads; they have cleaning plugs to the gasways, and their outer reflectors are of enamelled iron. The primary and secondary air inlets are independent, and dual feed burners, for reduction of light by controller at pre-determined times, are available. Redirection of light can be effected by the makers' range of "Staybrite" steel reflectors.

On this stand also were governors, lever cocks, conversion burners, and the "Avil" patent adjustable gas connection.

Gas Meter Company, Ltd.,

238, Kingsland Road, London, E. 2.

This Company were exhibiting and demonstrating their complete range of clock controllers, both "London" and "Kingsland" types. These controllers are fitted with clocks of English manufacture, and many types of clock are available to meet the variety of purposes for which they may be required.

The "London" controller is suitable for use with lamps having up to 16 mantles, or a consumption of approximately 60 cu.ft. per hour. If desired, it is fitted with a selective attachment so that it does not operate on any particular day or days of the week. A special fog attachment can be supplied for emergency operation.

The cluster type will extinguish a section of the burners at any predetermined time, and the remaining section at a later hour as desired. This controller is also being used extensively for industrial purposes.

Gowshall, Ltd.,

14-15, Lamb's Conduit Passage, Red Lion Square, W.C. 1.

This exhibit consisted of "Guardian Angel" illuminated guard posts and internally illuminated traffic signs carried on Bromford tubular steel posts.

Gas illuminated bollards were also shown on the stand, and for the purpose of demonstration these were illuminated by means of Calor gas, which provides a very convenient form of lighting for bollards fixed where no other source of illuminate is available. Calor gas bollards may be used for temporary bollard positions during the trial period in place of the usual inefficient device consisting of red danger lamps.

Holophane, Ltd.,

Elverton Street, Vincent Square, London, S.W. 1.

This Company were showing a very comprehensive range of street lighting equipment. The well-known "Duo-Dome" range of refractors for gas-filled lamps were shown in various types of lanterns, including the ornamental refractor for central pedestal positions in gardens, squares, and promenades. Another type of ornamental refractor is the Lennox lantern, which is also for pedestal mounting.

A number of floodlights were also shown, among which

was the " Rhyl " floodlight, a special decorative type unit for use in parks and gardens.

Horstmann Gear Company, Ltd.,
Newbridge Works, Bath.

This Company again made an interesting and comprehensive display of their well-known " Newbridge " products. All their standard types of gas controllers were shown, together with their " Comet " igniter. This latter is of particular interest to public lighting engineers, as by its use by-passes are eliminated, thereby enabling considerable economies in gas consumption to be effected. A point highly appreciated by users of the " Comet " igniter is the freedom it affords from the annoyances consequent upon extinguished pilot jets, of particular importance where lamps are fixed in exposed positions. So far the " Comet " has only been available for use with square lanterns, but Messrs. Horstmann have now produced an entirely new type of controller which can be applied to any type of suspension lamp, new or existing. Public lighting engineers will appreciate the benefits to be derived from this invention. It is hoped to have this new controller in production by the end of September.

James Keith & Blackman Company, Ltd.,
27, Farringdon Avenue, London, E.C. 4.

This firm displayed their " Supervia " high-pressure lamps, twelve of which were erected on columns around the bandstand and approach. The mounting height was 25 ft. The columns and brackets are supplied by the Bromford Tube Company. A small compressor, with a capacity of 350 cu.ft. per hour, was installed in a convenient position within the buildings, and a temporary service run to the lamps. On each column the lamps were fitted with Keith Blackman raising and lowering gears.

So much important street lighting has been accomplished by the " Supervia " lamps in London and elsewhere that this demonstration was specially appreciated by members of the Gas Industry.

C. H. Kempton & Co., Ltd.,
" Stangate House," 235, Westminster Bridge Road, S.E. 1.

The range of lamps exhibited at this stand demonstrated the many improvements that have been made in gas illumination for street lighting, floodlighting public buildings, and general lighting. Examples of the lamps demonstrated under working conditions were to be seen in the grounds surrounding the Exhibition. An example of gas floodlighting by this Company was to be seen in Cheltenham, where a rose garden was illuminated.

W. Parkinson & Co.,
Iron Lane, Stechford, Birmingham.

This exhibit comprised samples of the firm's well-known gas lamps and street lighting equipment.

The " Maxill " lamp was specially designed to conform with the recommendations of the Departmental Committee on Street Lighting of the Ministry of Transport, and is suitable at mounting heights of 18 ft. and upwards, for central or staggered lighting systems. It is supplied with even numbers of mantles from four to twelve. High-efficiency, stormproofness, and ease of maintenance are features of this low-pressure gas lighting unit.

The " Stechford " suspension globe lamp was also demonstrated in half-section to show the ventilation and combustion features. The " Stechford " lamp may be employed in most street lighting schemes, being equally suitable for Classes G to D of the British Standard Specification, and for streets lighted in accordance with M.O.T. recommendations.

The " Warwick " square lamp was shown fitted with " Mor-lite " and curved top " Staybrite " steel directional reflectors.

Representative exhibits of Parkinson floodlighting equipment included the 10-light upward-beam alignment lamp, and the projector type of floodlight lamp.

Samples of the " Adastra " sectional steel lamp columns, manufactured by Messrs. Poles, Ltd., of Tyburn Road, Erdington, Birmingham, were also on view.

Walter Slingsby & Co., Ltd.,
Woodhouse Road, Keighley.

The exhibits on this stand included demonstration models made to scale of the " Wask " patent " Up and Down " lamp suspenders for gas and electric lamps. This equipment lowers the lamps for attention on the footpath without disconnecting the supply to the lamps. The Company also exhibited actual fittings used in their suspension gear, together with some useful malleable iron pipe fittings for gas services.

William Sugg & Co., Ltd.,
Ranelagh Works, Chapter Street, S.W. 1.

The most prominent exhibit on this stand was the " B/2 " " London " lamp which is widely used for modern street lighting. The complete lamp, which is identical with those in use in the demonstration street by the exhibition, was mounted at eye level for inspection, and was fitted with " Horstmann " Comet Ignition. Adjacent to this was a skeleton of the lamp, consisting of the burner and the mirror glass reflecting system.

Two floodlights were shown—the 10-light parabolic projector lamp as used for the floodlighting of Pyatt Hotel and the Catholic Church, and the " Coventry " lamp designed for use where the floodlight unit must be within a few feet of the subject to be illuminated. Other lamps shown included various models of the popular " Rochester " lamp, a low-pressure " Supervia " lamp, and the new " High Street " lamp for exterior shop lighting.

An illuminating sign incorporating a clock was suspended at the back of the stand, while the facia of the stand was attractively emphasized by three chromium plated " Rochester " lamps fitted with octagonal panelled globes, as used with great success for modern parade lighting.

Also demonstrated was an automatic emergency gas switch, enabling emergency gas lighting to be brought into operation immediately upon the occasion of an electricity failure. This switch can also be used in conjunction with gas-fired furnaces with electrically operated forced draught. By a simple adjustment it can be arranged to switch off the gas in the event of a breakdown in the fan.

Athletic and Social

London Gas Bowling Association.

The semi-finals and finals of the above competitions were played on the green of the Wandgas Athletic Association. The pairs competition was played on Aug. 29, the results of the semi-final and final being:

SEMI-FINAL.

" A "	A. Stevens and A. Oliver (Gas Light Eastern)	18
	A. Paskell and W. Squire (Tottenham)	10
" B "	A. W. Beagley and W. Mackie (South Suburban)	24
	W. Oakes and J. L. Hawkins (Gas Light Western)	10

FINAL.

A. W. Beagley and W. Mackie	22
A. Stevens and A. Oliver	14

The singles competition for the " Charles Carpenter " Trophy was played on Sept. 5, the results of the semi-final and final being:

SEMI-FINAL.

" A "	W. Oakes (Gas Light Western, holder)	21
	W. H. Ginn (Gas Light Eastern)	18
" B "	A. Paskell (Tottenham)	21
	W. Baker (South Suburban)	15

FINAL.

W. Oakes	21
A. Paskell	15

At the conclusion of the match the trophies for both competitions were presented by Mrs. Croft, wife of Mr. C. M. Croft, General Manager of the Wandsworth and District Gas Company. Mr. P. C. Symondson, Wandgas, President of the London Gas B.A., thanked Mr. and Mrs. Croft for their support and Mrs. Croft for presenting the trophies. Mr. W. J. Spencer, Hon. Secretary of the Association, took the opportunity of publicly thanking Mr. Frank H. Jones for presenting the pairs trophy and passed a hearty vote of thanks to the Wandgas Athletic Association for the loan of their green and for the arrangements made for the comfort of the players and visitors.

" Domestic Utilization of Gas "

Publication of Part 2

In our advertisement columns to-day announcement is made of the publication of Part 2 of " Domestic Utilization of Gas," by Norman S. Smith and R. N. LeFevre. This new volume is a corollary to, and in no way a revision of, Part 1. The subjects dealt with are gas rate and combustion, fundamental to gas usage, the means by which entirely safe combustion can be ensured, the water heating load, refrigeration by gas, and gas measurement. The information is reliable and up-to-date, and is exactly the type to be of immediate practical service.

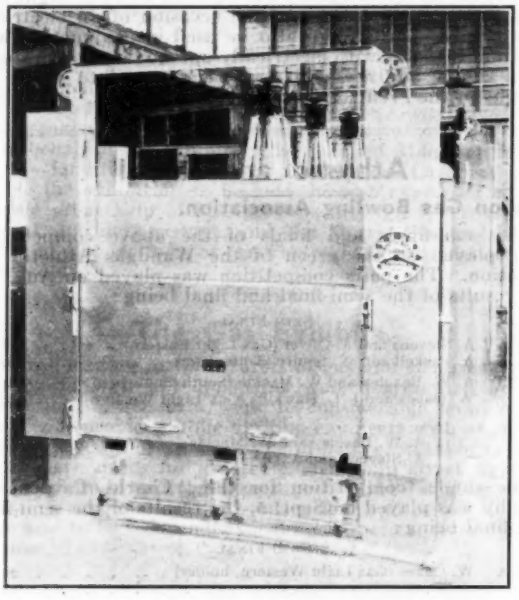
The price of the book, 5s. 6d. post free, brings it within the reach of all. " Domestic Utilization of Gas, Part 2, is obtainable from the " GAS JOURNAL " Offices, 11, Bolt Court, Fleet Street, E.C. 4.

Gas-Heated Tempering Furnaces

In which our contributor shows how forced air circulation improves the performance of gas-fired furnaces for low-temperature work.

by
A. J. G. SMITH

In furnaces for the lower scale of temperatures up to about 650° C. as used for tempering steel and a number of other processes, the amount of heat transmitted by direct radiation is comparatively small, and the desirability of increasing the amount of heat transmitted by convection has long been recognized. This can be effected by incorporating in the design of the furnace a fan for the purpose of driving the heated air through and around the charge of work to be heated. Although this is a common feature of electric furnace design, the principle has not been so widely adopted in connection with gas-fired furnaces. However, a considerable amount of development work in this direction has been proceeding of late in the United States as an offset to electric furnaces which are comparatively costly both in first cost and operation.



A Furnace Installed in a Large Motor Cycle Works.

While the mere provision of a fan for the circulation of the heated air in a furnace promotes a quicker rate of heating and a more even temperature, these advantages can naturally be greatly increased by certain modifications of the air ducts and distributing channels, and the method adopted in the American "Despatch" furnaces presents several points of interest. From the diagram it will be seen that two circuits are employed. One is the recirculating circuit, in which the heated air is constantly made to rise to the top of the furnace outside the working chamber, and on reaching the suction side of the fan is again driven downwards through the parts to be heated. The second circuit is provided by the current caused by the heated air and gases from the heat chambers at the bottom of the furnace. As the heated air and gases rise, they mix with the recirculating air and supply what additional heat is required to bring the latter to the proper working temperature. A flue nozzle with control damper is provided to secure proper ventilation of the furnace, but only a small percentage of the hot gases is lost through the flue.

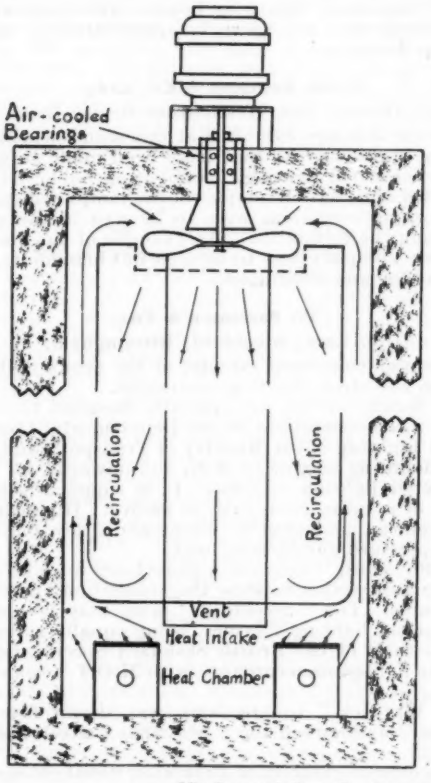
The action of the fan and baffles causes the heated air to penetrate to every nook and corner of the furnace and the work that is being heated. In the case of temperatures up to approximately 650° C., this circulating air is the chief heat transmitting medium, and as it is forced through the work it heats the whole of the charge evenly. The number of fans fitted depend both on the size of the working chamber and the rate at which it is required to pass work through the furnace, but in general the fan units are capable of recirculating the air through the furnace approximately 20 times per minute.

The photograph shows a typical convected air gas-fired furnace of the type described, installed in a motor cycle works, and suitable for temperatures up to 650° C. Heating is effected by surface-combustion burners for gas at mains pressure, and it is possible to equip the furnace with various items of equipment for the purpose of eliminating attendance almost entirely. A safety pilot-light control will automatically shut off the main gas supply in the event of pilot light or power failure. This consists of three safety pilots, one arranged for each gas burner, so disposed that if any of these are blown out the safety valve will turn off the gas. A pressurestat also will automatically close the valve, shutting down the gas supply in the case of any failure in the gas pressure, and automatic temperature control equipment can also be fitted which controls both temperature and the operation of the electrically-driven fan.

As examples of loading, the following are the maximum load capacities recommended for the three largest standard furnaces:

3 ft. × 3 ft. × 4 ft. high	3,600 lb.
4 ,, × 4 ,, × 4 ,, ,,	6,400 ,,
3 ,, × 8 ,, × 4 ,, ,,	10,000 ,,

Furnaces of this type incorporating forced air circulation have several advantages, one of the most important of which is the extreme uniformity of temperature. It is



[*By Despatch Oven Co., Minneapolis.*

Forced Air Circulation Oven.

claimed for the furnace just described that a standard oven incorporating this principle will maintain a given temperature within a limit of plus or minus 3° C. due to the system of handling the convected air currents. As already stated, the rate of heat transmission is greatly increased by the acceleration of the air circulation and a shorter working cycle results which increases the output of the furnace considerably. The range of parts now successfully treated in gas-heated furnaces of this class in different works now amounts to more than 90, and comprises such high production work as aeroplane parts, ball races, tools, pistons and other motor car parts, and glassware.

Gas Undertakings' Results

Alloa.

The Engineer and Manager of the Alloa Gas Department (Mr. J. W. Napier), in his annual report for the year to May 15, 1936, states that the gross profit amounted to £10,107, and after meeting charges for sinking fund £3,791, interest £2,635, income-tax £896, instalment for payment of Tillicoultry Undertaking £562, bad debts £28, the net profit amounted to £2,196. This profit has been disposed of by allocating a sum of £850 to income-tax reserve, £500 to retort repairs account, and the balance to reduce the sum at debit from £1,923 to £578. The quantity of gas made was 261,235,700 cu.ft., being an increase of 14,038,900 cu.ft., equal to 5·37%. The sum expended on coal was £16,046, the return from residuals—including benzole, £10,090—being 63·89% of the cost of coal, or equal to 11s. 5d. per ton of coal, making the net cost of coal 6s. 5d. per ton. The capital debt of the Undertaking is £79,712, equal to £305 8s. per million cu.ft. of gas made. At a meeting of the Gas Committee, the estimates for 1936-37 were submitted. It was agreed that the price of gas remain as at present, except that as from October next the gas rates in the County Area be reduced by 2d. per 1,000 cu.ft., thus making all the rates the same as in the case of Alloa and Alva.

Bridport.

The report of the Directors of the Bridport Gas Company, Ltd., for the year ended June 30, 1936, states that the sale of gas shows an increase on last year, and the prospects altogether appear favourable. Dividends at the rate of 5% on the "A" Preference, 6½% on the "B" Cumulative Preference, and 8% on the Ordinary shares, less tax, are recommended, carrying forward a balance of £1,256.

Cleveland.

The report of the Directors of the Cleveland Gas Company for the half-year ended June 30, 1936, states that there has been an increase in the sales of gas from 12,021,400 cu.ft. in the half-year to June 30, 1935, to 12,454,400 cu.ft., or 57,290 therms, during the past half-year. The profit made during the half-year has been £728, to which must be added the amount brought forward from last half-year, £4,596, making the balance at the credit of the profit and loss account at June 30, 1936, £5,323, which sum the Directors propose to dispose of as follows: In paying a dividend at the rate of 2% per annum (less income-tax), £399, to contingent fund (making it £9,600) £200, £599, leaving to be carried forward to next half-year's account £4,726.

Darlington.

The Gas-Works Accounts and Statistics of the County Borough of Darlington for the year ended March 31, 1936, show that the gross profit for the year is £11,440 as compared with £14,273 for 1934-35. The difference is due largely to increased manufacturing and distribution charges which have increased as a result of greater sales of gas, 625,769,000 cu.ft. as compared with 598,730,000 cu.ft. last year. The unaccounted-for gas figure has fallen from 5·36% to 5·12%. Residual products yielded less. Coke receipts fell from £11,830 to £11,648 and tar realized £3,907 against £4,184 last year. From the gross profit there fell to be deducted the liquidation of loans account for year's instalment to redeem loans, £4,784, interest on loans (gross), £1,871, and income-tax, £2,566, leaving a net profit of £2,515, which added to the balance brought forward from 1934-35, £5,424, leaves £7,939 to be carried forward to the credit of the Gas-Works net revenue account. The coal carbonized amounted to 39,301 tons as compared with 38,201 tons in 1934-35, and the gas made per ton of coal carbonized has increased to 16,995 cu.ft. from 16,790 cu.ft. The mileage of mains has increased from 156 to 164 during the year. Consumers have also increased from 23,206 to 23,849. Public lamps are also on the up-grade and have increased from 2,198 to 2,249. The receipts from the sale of coke (net) have fallen, although the quantity of coke and breeze saleable increased from 16,194 to 16,937 tons, because the average receipts fell from 14s. 7d. to 13s. 8d. per ton.

Singapore.

The report of the Singapore Municipal Gas Engineer, Mr. F. Bedford, on the working of the Gas Department for the year ended Dec. 31, 1935, states that Australian coal was carbonized throughout the year. The cost of coal delivered at the Works was $9.61 per ton as against $9.52 for 1934. The revenue from coke was $49,859.01 against $39,184.33 for 1934, the average price per ton being $20.38 against $18.67 for 1934. The revenue from tar was $17,070.85 against $19,678.96 for 1934. The tar made per ton of coal was 11·2 gallons against 11·6 gallons for 1934. The amount of gas manufactured was 297,178,000 against 286,800,000 cu.ft. during 1934, an increase of 3·6%. Of the above quantity 86,259,000 cu.ft. was water gas, equal to 29% of the make. Public lighting used 150,192,478 cu.ft., equal to 50·5% of the output. The amount of gas sold to private consumers was 120,639,056 cu.ft. against 118,406,682 cu.ft. during 1934, an increase of 1·9%. The net profit from fittings and stores was $5,024.85 against $2,939.98 in 1934. The gross profit made by the Department allowing for public lighting at cost was $282,674.50, and after deducting interest on loans, sinking fund, and depreciation charges, there was a net profit of $110,298.98 of which $48,825.37 was expended on additions of a capital nature to mains, &c., leaving a credit balance of $61,468.61. The net profit for 1934 was $107,267.86.

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RADFORD ROAD
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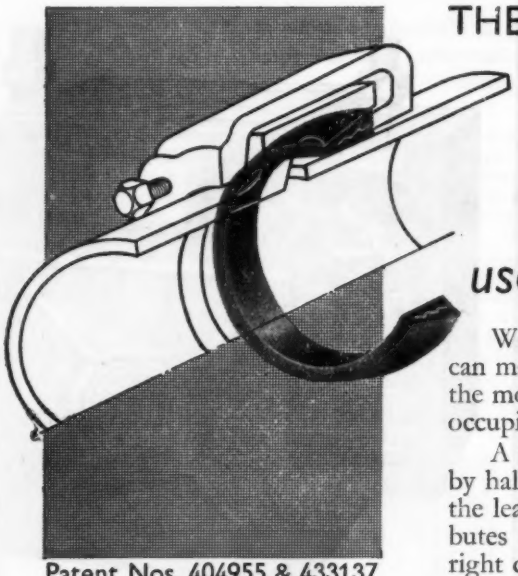
DERBY ROAD
WATFORD

MILES PLATTING
MANCHESTER, 10

THE **STANTON**
MECHANICAL
LEAD JOINT
uses this pre-cast lead ring



Patent Nos. 404955 & 433137

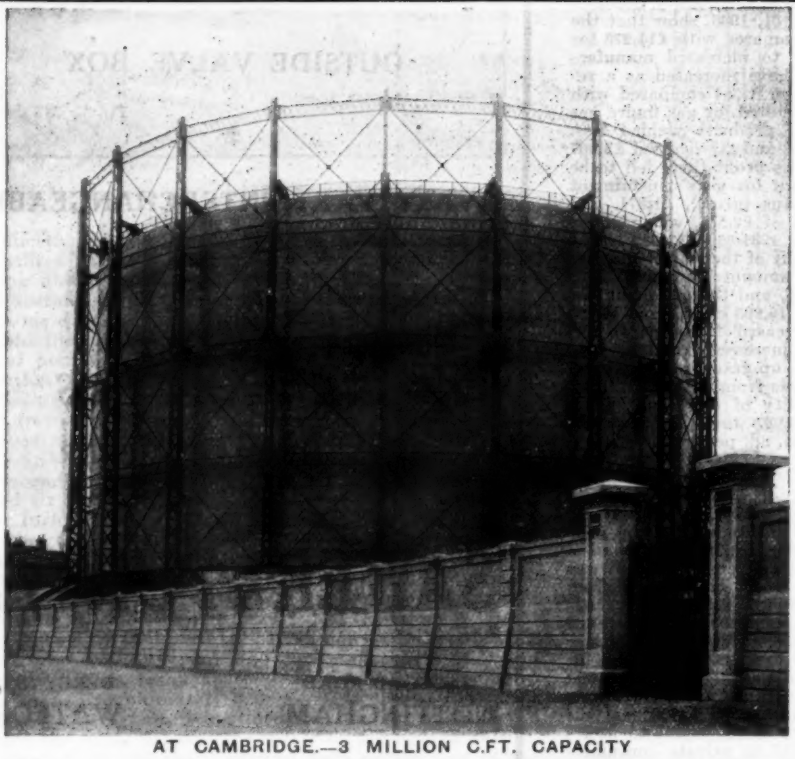
No increase in cost of pipeline

With an ordinary spanner, an unskilled workman can make this leaktight, trouble-free lead joint under the most difficult conditions in a fraction of the time occupied by lead melting, running and caulking.

A pre-cast lead ring is held positively in position by half-collars secured by cast-iron setscrews. Inside the lead is cast a spring insertion ring, which distributes the end pressure so that the joint is effective right down to the tip.

The completed Joint holds high air and water pressures, and permits "draw" of the spigot and angular distortion.

The Stanton Ironworks Company Limited, Near Nottingham



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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Business on the Stock Exchange opened in good style last week, though a set-back occurred on Wednesday, but this was speedily overcome and the week finished cheerfully. The gilt-edged market continued steady, and enquiry for India stocks led to some improvement in these issues. There was also a demand for Central European Government bonds, the German Dawes and Young loans recording sharp rises towards the close. Industrials were again in good demand and a large number went to higher levels, especially in the motor and aircraft group. Oils, under the lead of Shell Union, were active, while the rubber market received a fillip on the higher price of the commodity.

Activity in Gas Stocks and Shares was greater than for some time past, and prices of recorded transactions in many instances appeared to justify some further improvement in the quotation. It is interesting to note that several parcels of stock which are not as a rule readily obtainable came into the market—*e.g.*, Harrogate and Metropolitan (of Melbourne)—and these were speedily absorbed. A few stocks advanced in value a point or two, including South Metropolitan, Southampton, and Wandsworth ordinaries, while the highest was that of York 5% debenture in the Supplementary List with a gain of 4 points to 109½.

The accounts of the Alliance and Dublin Consumers' Gas Company for the period to June 30 last indicate that the Company has had another successful half-year. The gross profit is £81,327 as compared with £74,193 for the corresponding period in 1935, while the net profit has increased from £61,119 to £72,139. The Directors are recommending a dividend on the ordinary stock at the maximum statutory rate—viz., 8% per annum—which will absorb £70,698, leaving £50,655 to be carried forward (against £49,213 brought in). It will be remembered that the ordinary capital was increased in December last by an issue of £215,571. The sales of gas show an increase of nearly 12%. The stock is now quoted *ex* div. at 163½, at which price the yield works out at £4 17s. 10d. net, a high return having regard to the Company's strong financial position and very satisfactory progress.

Current Sales of Gas Products

The London Market for Tar Products.

Sept. 14.

There is but little change to report in the prices of tar products.

Pitch is nominal at 35s. per ton f.o.b.

Creosote, about 5½d. per gallon.

Refined tar, 3¾d.

Pure toluole, about 2s. 4d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 7d.; and 90/160 pyridine, about 5s. 3d. to 5s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Sept. 14.

The average prices of gas-works products during the week were: Gas-works tar, 19s. 3d. to 24s. 3d. Pitch—East Coast, 33s. to 35s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 33s. to 35s. 6d.* Toluole, naked, North, 1s. 10½d. to 1s. 11d. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 4½d. Heavy naphtha, North, 1s. 1½d. to 1s. 2½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 5d.; low gravity, 4½d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 2s. 4d. to 2s. 6d. Naphthalene, £21 to £23. Salts, 95s. to 100s., bags included. Anthracene "A" quality, 3d. to 3½d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Sept.* 12.

Market continues fairly steady although the upward tendency of prices of certain products appears to have been checked, at any rate for the time being.

Crude gas-works tar.—The actual value is 34s. to 35s. per ton *ex* works in bulk.

Pitch is weak but makers are continuing to quote round 32s. 6d. to 35s. per ton f.o.b. Glasgow for export, and 32s. 6d. per ton *ex* works in bulk for home trade.

Refined tar remains unchanged at 3d. to 3¼d. per gallon f.o.r. for export, and 3¾d. to 4d. per gallon *ex* works in buyers' packages for home trade, with supplies plentiful.

Creosote oil.—There is a lull in buying and prices are a little unstable as follows: Specification oil, 4¾d. to 5d. per gallon; low gravity, 4⅞d. to 5⅛d. per gallon; neutral oil, 4⅝d. to 4⅞d. per gallon; all *ex* works in bulk.

Cresylic acid.—Supplies continue to be most difficult to secure and values are well maintained as under: Pale, 97/99%, 2s. 3d. to 2s. 5d. per gallon; dark, 97/99%, 2s. to 2s. 2d. per gallon; pale, 99/100%, 2s. 9d. to 3s. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Production is low and price is steady at 5½d. to 6d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha is 1s. to 1s. 1d. per gallon.

Motor benzole is rather quiet at 1s. 3½d. to 1s. 4d. per gallon.

Pyridines.—90/160 grade is 5s. to 5s. 6d. per gallon, and 90/140 grade is 5s. 6d. to 6s. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	8½	to	0	9	per gallon at works
Motor "	1	2	"	1	2½	" " "
90% "	1	3	"	1	3½	" " "
Pure "	1	7	"	1	7½	" " "

Contracts Advertised To-Day

Boiler.
Darlington Gas Department. [p. 668.]

Static Washer.
Ilkeston Gas Department. [p. 668.]

Steel Frame Building.
Darlington Gas Department. [p. 668.]

Sulphate of Ammonia.
Carlisle Gas Department. [p. 668.]

Trade Notes

Cochran & Co. (Annan), Ltd.: Change of Address.

We have received intimation that the London Office and Export Department of Messrs. Cochran & Co. (Annan), Ltd., has recently been moved to 34, Victoria Street, S.W. 1, the telephone number remaining unaltered, Victoria 9341.

Powers-Samas, Ltd.: New Address.

The new address of Powers-Samas Accounting Machines, Ltd., is Powers-Samas House, Holborn Bars, London, E.C. 1. The change took place on Sept. 7. The Firm's telephone number is now Holborn 8711 [8 lines]. Powers-Samas House is near to Chancery Lane Tube Station.

John Thompson Engineering Company, Ltd.

We are informed by the John Thompson Engineering Company, Ltd., that they have taken over Triumph Stoker, Ltd., of Leeds, the well-known manufacturers of all types of mechanical stokers, elevators, and conveyors. The company has been engaged in the manufacture of these products for forty years, and has some thousands of installations in all parts of the world. The company will still operate as Triumph Stoker, Ltd., at its present address at Kirkstall Road, Leeds, and the existing staff and employees will be maintained.

George Waller & Son, Ltd.: Recent Contracts.

Messrs. George Waller & Son, Ltd., of Phœnix Iron Works, Stroud, inform us that their recent activities include the following contracts: Two vertical enclosed type gas compressors, each for 180,000 cu.ft. per hour for the Barnsley Coking Company; another compressor of the same type for 250,000 cu.ft. per hour (repeat order) for the Shelton Iron and Steel Company; two others for 200,000 cu.ft. per hour for the Stretford and District Gas Board; another for 200,000 cu.ft. per hour (repeat order) for the Stockport Gas Department; four sets of Waller 4-blade exhausters, each for 250,000 cu.ft. per hour for the Brighton, Hove, and Worthing Gas Company; two "Michell" crankless compressors for ½ million cu.ft. per hour each for the Wellington Gas Company, New Zealand; and one 106,000 cu.ft. per hour crankless booster for Stockholm.

● *Apply* **SCIENTIFIC CONTROL** *to the best advantage by adopting*

THE WEST SYSTEMS

OF MODERN GAS AND COKE PRODUCTION

The West organization has co-operated with progressive Gas Undertakings in 24 countries in their schemes of works modernization, plant renewal, and extension.

- **GLOVER-WEST VERTICAL RETORTS**
- **WESTVERTICAL CARBONIZING CHAMBERS**
- **BREEZE-FIRING PRODUCER EQUIPMENT**
- **WASTE-HEAT RECOVERY PLANTS**
- **THE WEST LIP-BUCKET CONVEYOR WITH AUTOMATIC LUBRICATION**
- **COKE GRADING AND PREPARATION UNITS**

Contracts placed with West's Gas Improvement Company, Ltd., during the present year have included carbonizing plant installations for the Gas Undertakings of *Altrincham, *Bilston, *Carlisle, *Dudley, *Worcester, and *Yeadon, in England ; *Dumbarton, *Grangemouth, and Kelso, in Scotland; *Ballymena, in Ireland, and *Johannesburg, in South Africa.

* Repeat orders

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING — 'Phone: COLLYHURST 2961 : 'Grams: "STOKER, MANCHESTER"

LONDON: COLUMBIA HOUSE, ALDWYCH, W.C.2 — 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES.

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 11	Rise or Fall on Week	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 7	7⅞	8	Alliance & Dublin Ord. ...	161—166*	−3	...
374,000	,,	June 22	4	4	Do. 4 p.c. Deb. ...	94—99	...	...
557,655	,,	Aug. 10	7	7	Barnet Ord. 7 p.c.	167—172	...	...
300,000	1	Mar. 30	1/4⅛	1/9⅛	Bombay, Ltd.	1⅛—1⅜	...	27/6
179,305	Stk.	Aug. 10	9⅛	9⅛	Bournemouth sliding scale ...	220—230	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	...
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	...
50,000	,,	June 22	3	3	Do. 3 p.c. Deb. ...	84—89	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	108½
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
357,900	,,	Aug. 10	7½	7½	Brighton, &c., 6 p.c. Con. ...	168—173	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	153—158	...	156
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	142—147	...	...
855,000	,,	Mar. 2	7	8	British Ord.	158—163	...	...
100,000	,,	June 8	7	7	Do. 7 p.c. Pref.	151—156	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—115	...	113½
200,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	97—99	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	..	39/—40/-
150,000	Stk.	June 22	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	July 20	6	6	Cardiff Con. Ord.	128—133	...	...
237,860	,,	June 8	5	5	Do. 5 p.c. Red. Deb.	108—113	...	...
609,204	1	Mar. 30	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	19/—20/-	...	18/9—19/-
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/-—24/-	...	23/1½—23/6
1,775,005	Stk.	Aug. 10	5	5	Commercial Ord.	95—100	...	96—96½
620,000	,,	June 8	3	3	Do. 3 p.c. Deb. ...	84—89	...	87—88
286,314	,,	Aug. 10	5	5	Do. 5 p.c. Deb. ...	118—123	...	...
807,560	,,	Aug. 10	7	7	Croydon sliding scale ...	157—162	...	161—161½
644,590	,,	,,	5	5	Do. max. div.	113—118	...	117—118
620,385	,,	June 22	5	5	Do. 5 p.c. Deb.... ...	123—128	...	...
239,000	,,	Aug. 10	5	5	East Hull Ord. 5 p.c....	107—110	...	...
184,555	,,	Aug. 10	6	6	East Surrey Ord. 5 p.c. ...	128—133	...	...
176,211	,,	June 8	5	5	Do. 5 p.c. Deb. ...	123—128	...	125—125⅛
250,000	1	June 22	4	6	Gas Consolidation Ord. ...	20/6—22/6	...	...
250,000	1	May 18	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/-	...	20/—20/3
19,284,128	Stk.	Aug. 10	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	27/3—28/3a	...	27/4½—27/10½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.... ...	89—92	...	91—92
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	104—108	...	106½—107½
8,602,497	,,	May 18	3	3	Do. 3 p.c. Con. Deb. ...	88—91	...	89½—91
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	117—120	+1	118½—119½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	116½—117
700,000	,,	Sept. 7	...	25/5‡	Do. 3½ p.c. Red. Deb. ...	102—104*	-1	...
270,466	,,	Aug. 24	6	6	Harrogate New Cons. ...	128—133	...	130—132
157,500	1	Mar. 16	1/7½	1/7½	Hongkong & China, Ltd. ...	1⅞—1⅞	...	...
213,200	Stk.	Aug. 10	6	6	Hornsey Con. 3½ p.c. ...	133—138	...	...
5,600,000	,,	May 18	8	12	Imperial Continental Cap. ...	132—137	−3	130—136½
223,130	,,	July 20	3½	3½	Do. 3½ p.c. Red. Debs.	92—97	...	96
285,242	,,	Aug. 24	8½	8½	Lea Bridge 5 p.c. Ord. ...	172—177	...	...
11,751	,,	,,	10	8	Maidstone Gas 5 p.c. Cap. Stk.	190—200	...	...
63,480	,,	June 22	3	3	Do. 3p.c.Prp.Db.Sk.	80—85	...	...
75,000	,,	May 18	†10	†10	Malta & Mediterranean ... Metropolitan (of Melbourne)	190—200	...	...
392,000	—	Apl. 1	5½	5½	5½ p.c. Red. Deb.	102—107	...	105¾—106½
231,978	Stk.	Aug. 24	5	5	M.S. Utility 'C' Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105—106½
360,075	,,	June 22	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	122—127	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	Stk.	June 22	†3	†6	Montevideo, Ltd.	68—73	...	...
225,000	,,	Aug. 10	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Aug. 10	5	5	Northampton 5 p.c. max. ...	110—115	...	...
300,000	,,	Apl. 20	†9	†7	Oriental, Ltd....	165—170	...	...
416,617	,,	June 8	8	8	Plymouth & Stonehouse 5 p.c.	168—173	...	...
504,416	,,	Aug. 10	8½	8½	Portsmouth & Gosport Cons.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	112—117	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	118—123	...	...
114,000	,,	July 20	5	5	Preston 5 p.c. Pref.	110—115	...	...
355,698	1	Apl. 20	1/-	1/-	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	...	22/1½
454,510	1	Mar. 16	-/10½	-/10½	,, ,, 4½ p.c. Cum. Pref.	21/—23/-	...	22/4½
133,201	Stk.	Aug. 24	5	8½	Shrewsbury 5 p.c. Ord. ...	145—150	...	...
90,000	10	June 8	†3½	†4	South African...	4—5	...	...
1,106,173	1	Sept. 7	1/2‡	1/2‡	South East'n Gas Cn. Ld. Ord.	26/—28/-*	−/6	21/6
845,511	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/—23/-*	...	...
200,000	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20 6—21/6*	−/3	...
450,000	Stk.	Aug. 10	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Aug. 10	6½	5	South Met. Ord.	126—129	+1	126½—128½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	145—150	...	147—147½
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	103—106	...	105½
1,895,445	,,	June 22	3	3	Do. 3 p.c. Deb. ...	87—90	...	88½
1,000,000	,,	July 6	5	5	Do. 5 p.c. Red. Deb.	114—117	...	115½
1,543,795	,,	Aug. 10	6	6	South Suburban Ord. 5 p.c....	129—134	...	132½—134
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	120—125	...	121
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	102—107	...	105½
888,587	,,	June 8	5	5	Do. 5 p.c. Deb....	121—126	...	123
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	102—107	...	...
427,859	1	May 4	9⅜	1 2⅛	S. Western Gas & Water Ord.	21 6—23/6	...	22/6—23/3
160,523	1	Apl. 20	...	-/10½	Do. 4½% Red. Cum. Pref.	21/—23/-	...	22/9
110,000	Stk.	June 22	4	4	Do. 4% Red. Deb. ...	100—105	...	...
647,740	,,	Aug. 10	5½	5	Southampton Ord. 5 p.c. ...	112—117	+1	115
121,275	,,	June 8	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 10	5½	5½	Swansea 5½ p.c. Red. Pref. ...	109—114	...	113
106,000	,,	June 8	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	...
94,000	,,	,,	...	...	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 10	6½	6½	Tottenham and District Ord.	149—154	...	152
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	128—133	...	131
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
371,850	,,	June 8	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
369,774	,,	Aug. 10	7	7	Uxbridge, &c., 5 p.c. ...	155—160	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
1,340,521	,,	Aug. 10	7	7	Wandsworth Consolidated ...	159—164	+1	160—163½
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	+1	124½—125¾
500,000	,,	,,	...	...	Do. 4 p.c. Pref. ...	104½—106½	...	105¾—106
1,317,964	,,	June 8	5	5	Do. 5 p.c. Deb. ...	123—128	+1	127—128
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
499,735	,,	Aug. 10	7¼	7	Watford and St. Albans Ord.	153—158	...	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	131—136	...	...
200,000	,,	June 22	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	99—102	...	101½—102½
158,400	,,	Aug. 24	6b	5½	Winchester W. & G. 5 p.c. Con.	120—125	...	...

a.—The quotation is per £1 of Stock. b.—Paid £3, including 10s. on account of back dividends. * Ex div. † Paid free of income-tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

Another large Gas Works

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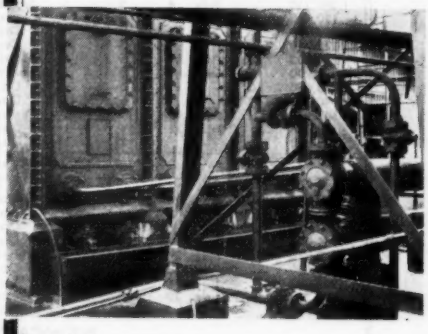

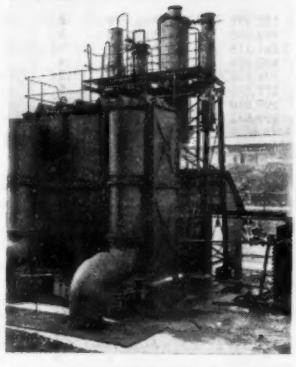

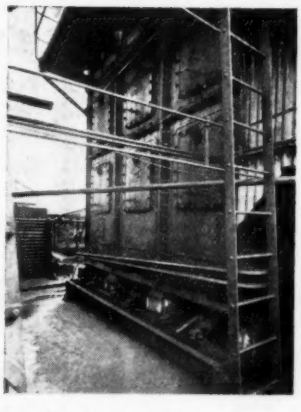

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Sept. 11.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 20	6	5	Bath Cons.	122½—124½	...	...
1,667,250	,,	July 6	5	5	Bristol, 5 p.c. max. ...	120—122	...	...
120,420	,,	June 8	4	4	Do. 1st 4 p.c. Deb. ...	101½—103½	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb.	101½—103½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	124—127	...	...
274,000	,,	Aug. 10	5	5	Newport (Mon.) 5 p.c. max....	110—114	...	...
13,200	12	Sept. 7	8⅔	7	Pontyp'l Gas & W. 10 p.c. 'A.'	13½—14½*	—½	...
13,600	10	,,	6	5	Do. 7 p.c. B.'	11½—12½*	—½	...
40,000	10	,,	6	5	Do. 7 p.c.' C.'	11½—12½*	—½	...
140,778	Stk.	Aug. 10	5	5	Weston-super-Mare Cons. ...	112—114	...	...
64,338	,,	June 22	4	4	Do. 4 p.c. Deb.	96½—98½	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	163—166	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug. 10	6½	5	Chester 5 p.c. Ord.	107—112	...	...
92,500	,,	June 8	4	4	Do. 4 p.c. Pref.	98—102	...	...
32,540	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Aug. 24	6	6	Liverpool 5 p.c. Ord. ...	133—135	...	...
245,500	,,	June 22	5	5	Do. 5 p.c. Red. Pref ...	103—108	...	...
306,083	,,	July 6	4	4	Do. 4 p.c. Deb. ...	104—106	...	...
106,280	,,	July 20	10	10	Preston 'A' 10 p.c. ...	198—208	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	137—147	...	...
NEWCASTLE EXCHANGE.								
122,877	Stk.	Aug. 10	8	8	Blyth 5 p.c. Ord.	151—153	...	...
732,000	,,	Aug. 10	5	5	Hartlepool G. & W. Co. & New	120—122	...	...
2,061,315	,,	Aug. 10	5½	5	Newcastle & Gateshead Con.	27/6—28/6a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	103—105	...	...
776,704	,,	June 22	3½	3½	Do. 3½ p.c. Deb. ...	99—101	...	...
277,285	,,	May 4	5	5	Do. 5 p.c. Deb. '43...	103—104	...	...
209,820	,,	Aug. 10	8½	8½	South Shields Con.	172—174	+1	...
299,542	,,	Aug. 10	6	6	Sunderland 6 p.c. max. ...	130—132	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 10	10	7	Derby Con.	174—184	...	...
35,000	,,	June 22	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	June 8	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,008	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Aug. 24	6	6	Sheffield Cons.	144—146	...	...
95,000	,,	July 6	4	4	Do. 4 p.c. Deb.... ...	99—101	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Sept. 7	...	5	Ascot Ord.	117—122*	−2	120—120½
128,182	,,	July 6	...	5	Do. 5 p.c. Pref.	115—120	...	118
238,631	1	June 8	5	5	Assd. Gas and Water Ord....	21/—23/-	...	...
323,681	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	21/6—23/6	...	...
150,000	Stk.	...	...	...	Do. 3½ p.c. Red. Deb. ...	99—102	...	...
17,000	,,	Aug. 24	8	8	Bognor Orig. Ord. 'A' ...	175—185*	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	175—185*	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	145—150*	...	...
37,440	,,	Aug. 10	10	10	Cam.Univ. & Town 10 p.c.max.	205—215	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	155—160	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	108—113	...	...
65,000	,,	Aug. 10	8½	7½	Eastbourne 'A' 5 p.c. ...	168—173	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	140—145	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
130,000	,,	June 22	5	5	Do. 5 p.c. Deb.	124—129	...	...
24,000	30	Aug. 10	8½	8½	Great Yarmouth 8½ p.c. max.	51—56	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	42—45 f	...	...
51,160	Stk.	June 8	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...
152,600	,,	Sept. 7	8	8	Guildford Cons.	182—192*	−3	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119*	...	...
68,250	,,	June 8	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Aug. 24	7½	7½	Hampton Court Cons. ...	173—178*	...	...
107,960	10	Mar. 16	4	5½	Mid Kent Ord.	10—11	...	...
230,940	Stk.	Aug. 10	10	10	Oxford & District Ord. ...	205—215	...	205
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	119½
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pre ...	113—118	...	...
126,193	,,	May 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Sept. 7	6½	7½	Redditch Ord.	133—143*	+½	...
166,850	,,	Aug. 10	9	8	Romford Ord.	168—178	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 16	5	5	Do. 5 p.c. Deb.	122—127	...	...
10,950	,,	Aug. 24	8	8	Ryde Ord.	165—170*	...	...
136,191	,,	Aug. 10	7	5	Scarborough Ord.	126—136	...	...
27,825	,,	Aug. 24	8	8	Shanklin & Ventnor Cons. ...	180—190*	...	...
40,643	,,	Mar. 2	7	7	Slough Ord.	147—152	...	...
221,000	,,	June 22	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	May 4	5½	5½	S. Midland Gas Cpn.Ltd. Ord.	20—22 -	...	...
28,866	1	Sept. 7	4½	4½	Do. 4½ p.c.Red. Cum Pref.	22/—24/-*	...	...
137,730	Stk.	Aug. 10	7	7	Southgate & Dist. 7 p.c. max.	151—156	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
117,228	,,	Aug. 10	6	5	Swindon Cons.	110—115	...	...
60,425	,,	June 22	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
64,380	,,	June 8	5	5	Torquay and Paignton 5 p.c. Pf.	117—122	...	...
750,000	1	Mar. 30	...	5·52d.	a Utd. Kingdom Gas Cpn. Ord.	21/3—22/3	...	21/7½—21/10
423,655	1	,,	2½	2½	Do. 4½ p.c. Prefd. Ord....	20/—22/-	...	...
916,091	1	May 18	2½	4½	Do. 4½ p.c. Cum. Pref. ...	21/6—22/6	...	22/6
400,000	Srk.	Mar. 16	...	3½	Do. 3½ p.c. Red. Deb. ..	98—101	...	...
130,000	,,	Aug. 10	8	5	Wakefield Ord.	140—145	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	105—110	...	...
82,000	,,	July 20	6	6	Weymouth Ord.	105—110	...	...
98,384	,,	Aug. 10	6	6¶	Wolverhampton 6 p.c. Pref.	127—132	...	...
160,000	,,	June 8	5½	5½	Do. 5½ p.c. Rd. Db	107—112	...	...
370,000	,,	July 20	6	4	York Cons.	107—112	+2	...
90 000	,,	June 22	5	5	Do. 5 p.c. Red. Deb. ...	107—112	+4	...
133,640	,,	July 20	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	130—135	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
35,800	,,	June 22	5½	5½	Do. 5½ p.c. Deb.... ...	130—135	...	...

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